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Thirty-three participants with experience in 15 countries concerned themselves with the following issues: (1) the role of education in achieving economic-social-political development, (2) types of skills, knowledge, and personality traits needed in different occupational roles, (3) the allocation of functions of occupational education among various institutions and systems of instruction, (4) organizations and incentives for promoting training by employing organizations, (5) ways of providing feedback about the actual needs of the production system, (6) the advisability of separate academic and vocational schools at secondary level, (7) the cost effectivess of occupational education, and (8) methods of financing occupational education. Major topics discussed during the July 24-August 4, 1967 period were: (1) Interrelationships of General and Occupational Education, (2) Curriculum Development in Occupational Education and Training, (3) Organization of Occupational Education and Training, (4) Agricultural and Rural Aspects of Occupational Education and Training, and (5) Frontiers for Action in Occupational Education and Training. Discussion of the workshop participants, 16 prepared papers presented for discussion by participants, and a reference list are included. (DM)

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OCCUPATIONAL EDUCATION and TRAINING FOR DEVELOPMENT: ACCOUNT OF AN INTERNATIONAL CONFERENCE AT STANFORD

by Marian Alexander-Frutschi, Editor

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OET-3. Issues in Occupational Education and Training: A Case Study in Jordan, by Najati Al-Bukhari. 1968.

OET-4. Issues in Occupational Education and Training: A Case Study in Tunisia, by Najati Al-Bukhari. 1968.

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Studies in preparation.

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FOREWORD

by

Eugene Staley

The letter of invitation which initiated the international Workshop on Occupational Education and Training for Development announced that the two weeks of roundtable discussion would "deal with the preparation of young people and adults for occupational roles, both in newly developing and highly developed economies." Drawing upon experiences around the world, it would "raise questions of policy, program, and method which concern educational planners and development leaders everywhere." With the help of background papers circulated in advance and of a highly selected group of participants and expert consultants, it would "explore traditional and emerging concepts of occupational preparation, examine current 'best practices' ... clarify controversial issues and unsolved problems, and endeavor to arrive at principles that can help to guide the occupational education and training plans of countries in various stages of development." In particular, it was anticipated that the following issues would receive attention:

-- The role of general and of occupationally-oriented education in achieving economic-social-political development.

-- The types of skills, knowledge, and personality traits needed in different occupational roles and in different lines of activity. How can these be analyzed? How can they best be taken into account in designing curriculum content, syllabi, and methods of instruction?

-- The allocation of functions of occupational education and training among various institutions and systems of instruction. Which functions are best handled as a part of regular schooling? In special vocational, technical, or professional schools prior to employment? By classroom or on-the-job instruction at the point of employment or after employment? By apprenticeship, internship, or similar devices? By conferences, conventions, demonstrations, advisory or extension services, correspondence courses, and other extra-school means?

-- Organizations and incentives for promoting more and better training by employing organizations.

-- Ways of providing feedback to the education and training system about the actual needs of the production system.

-- The advisability of separate academic and vocational schools at the secondary level vs. comprehensive or multichannel schools.

-- The relative costs of various types and methods of occupational education and training, and benefits in relation to costs.

-- Methods of financing occupational education and training.

These were in fact the issues discussed. The summary record presented in the present volume makes stimulating and illuminating reading, thanks especially to two factors. One is the rare combination of broad knowledge, sound scholarship, responsible experience, and articulateness represented in the international gathering. The other is the perspicacity and industry with which Mrs. Marian Alexander-Frutschi has worked through the voluminous discussion record, extracting the essential ideas, sorting and rearranging them so as to bring together mutually reinforcing contributions, thus producing a coherent and orderly account. As can happen with a skilled rapporteur, the edited result is more coherent and orderly than the original give and take of oral discussion.

This report is the second in a set of studies on occupational education and training as related to problems of economic-social-political development which SIDEC is issuing as part of its research program. The central endeavor of the research program at SIDEC is to advance theoretical and empirical knowledge and practical strategies pertinent to determining optimum content and methods of education for development. The studies on occupational education and training constitute one of the major subdivisions within this over-all program. Other major subdivisions, in which studies are now in progress, include 1) Education's Role in the Formation of Social and Civic Attitudes and 2) Education's Role in the Rural-Urban Transformation. A list of studies already issued or in preparation may be seen on page iii.

This three-pronged program of SIDEC research on the Content and Methods of Education for Development is substantially assisted by funds available under a research contract with the Office of Education, Department of Health, Education, and Welfare of the United States Government. While the expenses of the Workshop itself were, except to a minor extent, defrayed from other sources, the expense of reporting and circulating the results of the discussions in this volume have been met from the research contract funds.

STANFORD UNIVERSITY

SCHOOL OF EDUCATION

Stanford International Development Education Center (SIDEC)

WORKSHOP ON OCCUPATIONAL EDUCATION AND TRAINING FOR DEVELOPMENT

July 24 - August 4, 1967

LIST OF PARTICIPANTS

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Baqar A. Zaidi - Associate Professor, Western Washington State College, Bellingham, Washington; Author of study on rates of return in education for agricultural development in West Pakistan.

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INTRODUCTION

The SIDEC Workshop on Occupational Education and Training for Development opened on July 24, 1967, in the sunny green and golden setting of the foothills of Northern California's coastal range where the Stanford University campus is located. For two weeks Serra Lounge in Stern Hall provided a (mostly) quiet enclave for the series of discussions that took place close to the bustle of Palo Alto's section of El Camino Real (the historic old mission route of the Spanish padres). The adjoining patio, living quarters, and nearby cafeteria proved a pleasant setting for relaxation as well as continued, valuable discussion on a person-to-person basis. The nearby attractions of San Francisco, the Pacific Coast, and the Monterey Peninsula received their share of attention during weekends and free days.

The purposes of the Workshop, enunciated by its Director, Dr. Eugene Staley, at the opening plenary session, were three. Most important was the opportunity provided this gathering of more than thirty interested and eminent persons from a variety of scholarly and practical development backgrounds around the world to learn from each other. Another purpose was to draw attention to key issues, promising ideas, and emerging best practices and thus generally advance the development of the theory and practice of occupational education and training, especially as it relates to the problems of newly developing countries. A final purpose of the Workshop was to draw attention to unsettled issues where the research community--represented by quite a number of the participants --might make useful contributions to this important area of activity.

The Workshop took place in a series of plenary sessions, interspersed with periods when participants broke up into three smaller working groups for more concentrated discussion of (1) Curriculum Development in Occupational Education and Training, (2) Organization of Occupational Education and Training, and (3) Rural Agricultural Aspects of Occupational Education and Training.

Available space has not permitted the reproduction here of much of the very interesting and widely ranging dialogue which took place at this Workshop. Remarks attributed to participants are paraphrased and generally condensed, unless indicated by quotation marks. However, three particularly valuable discourses by Lady Gertrude Williams, Dr. Sidney High, and Dr. Nathaniel Frank have been reproduced in the appropriate contexts substantially as delivered and as recorded, more or less clearly, on a reluctant tape recorder. In all cases the text has been submitted to participants for verification and revision, as our intent is to convey either what participants said or what they meant to say, whichever they feel is more valuable.

In advance of the Workshop three documents were sent out to participants to provide a common background for the various issues to be discussed. The first was a draft monograph entitled, *Planning Occupational Education and Training for Development*, prepared by Dr. Eugene Staley specifically to raise issues for discussion at the Workshop. This "Planning Document," as it will be referred to henceforth, has been revised and amplified in the light of the Workshop discussions and has been published separately.

The second document circulated for conference background was the Massachusetts Institute of Technology's *Final Report of the Summer Study on Occupational, Vocational and Technical Education*, July 6-August 13, 1965 (and a separate brief *Summary* of the same). This report is henceforth referred to as the "Summer Study." (See Section I for an abstract.) It explores efforts spearheaded by Dr. Nathaniel Frank of M.I.T. to break down the traditional barriers between academic and vocational education and achieve a better balance between them through what he terms "investigative learning." Dr. Frank was able to spend parts of two days with the Workshop for discussions on an integrated approach to general and occupational education.

The third document circulated in advance was *The Report of the Comparative Technical Education Seminar Abroad and Recommendations for a National Plan of Vocational and Technical Education in the Republic of Nigeria* (henceforth referred to as the "Nigerian Seminar"). This report was produced under the chairmanship of Dr. Adam Skapski and published in 1966. It deals with a study of technical education by 18 of the most experienced Nigerian technical education officers. This notable work contains important recommendations, of interest in other countries as well as in Nigeria, on general education and pre-vocational and pre-technical training and on the role of industry in vocational and technical training. Dr. Skapski and one of the leading members of the Seminar Abroad, Mr. Okwvese Ozoro, were full-time Workshop participants.

During the Workshop a number of valuable original papers and reprints of previously published papers and articles contributed by various members of the Workshop were reproduced and distributed to all participants. As many as possible of these original papers are included here at the end of the appropriate sections. Previously published papers available elsewhere are listed in the Reference List.

An attempt has been made to bring together in coherent form--by broad subject areas that were used during the Workshop--ideas that emerged sometimes at separate points in the discussions and to group these with related speeches and original papers. The success of the attempt is open to question, due to the difficulties described so well by Dr. Fred Carvell when introducing his Working Group report: "Preconditioned by Dr. Frank's inspiring ideas about an a-disciplinary approach, I find it a problem to write in linear form what could best be described as a 'pile' or 'heap' of ideas in discussion." However, the discussion which hopped so nimbly over a broad spectrum of issues, facts, and opinions has been forced willy-nilly into five major subject areas:

Section I on Inter-Relationships of General and Occupational Education starts where the Workshop itself found it necessary to start (with a discussion of the distinction between education and training) and deals with several issues that affect the entire field of occupational education and training. Here also will be found Dr. Nathaniel Frank's Comments on the Philosophy of Learning and Vocational Education which provided a challenging framework through which to view many of the problems discussed during the Workshop.

Section II on Curriculum Development carries the Curriculum Working Group's report and a summary of related discussions in the plenary sessions. Here will be found the major part of Dr. Sidney High's enlightening talk on current curriculum studies and innovations sponsored by the Division of Comprehensive and Vocational Education Research of the U.S. Office of Education.

Section III on Organization of Occupational Education and Training carries that Working Group's report, which focuses on the OTO device. The inner workings of one of the most extensive of the existing occupational training organizations was described in detail for the Workshop by Lady Gertrude Williams in an informative discussion of The United Kingdom Industrial Training Act of 1964. The talk is reproduced herein.

Section IV was written by Mr. Peter Hopcraft, who reports on Agricultural and Rural Aspects of Occupational Education and Training as it was discussed in the Working Group and the Plenary sessions. Here is also included a Background Paper on that important subject by Mr. Hopcraft.

Section V on Frontiers for Action in Occupational Education and Training carries the closing discussions on needed areas of research in the field and on new techniques for implementing sound principles of occupational education and training already in existence.

(Mrs.) Marian Alexander-Frutschi
Workshop Editor

I. INTER-RELATIONSHIPS OF GENERAL AND OCCUPATIONAL EDUCATION

A. Report of Workshop Discussion

The Distinction between Education and Training

- The Allocation of Responsibility for Education and Training
- General Education as Preparation for Life Work

The Limits of Choice

Analyzing the Needs for Occupational Education and Training

- Manpower Planning
- Occupational Analysis is Pivotal
- Dictionary of Occupations Needed

Comments on the Philosophy of Learning and Vocational Education by Dr. Nathaniel Frank

A Discussion of the Philosophy of Learning and Vocational Education

- Educating for Technological Change
- Conceptualizing Becomes Increasingly Important
- Educating for Social Change

B. Related Workshop Papers

"Abstract of the Summary Report" from Final Report of the Summer Study on Occupational, Vocational and Technical Education (Dr. Nathaniel Frank, Principal Investigator), Massachusetts Institute of Technology, 1965.

Random Thoughts on the Roles of General Education to Support Economic, Social and Political Development by Nikom Chandravithun.

The Role of Domestic Volunteer Service Programs in the Development of Human Resources in Developing Countries by Dr. Irene Pinkau.

A Brief Memo on Manpower Forecasting by O. Ozoro.

I. INTER-RELATIONSHIPS OF GENERAL AND OCCUPATIONAL EDUCATION

A. Report of Workshop Discussion

The Distinction between Education and Training

The first issue tackled by the Workshop was the distinction between education and training--two terms used with great frequency throughout the discussions. To define more clearly the elements which differentiate one from the other, Dr. Staley proposed that the group consider education as that process of instruction and learning which prepares a person to function in a wide range of occupational and general living situations. It would include such broadly applicable items of skill, knowledge, and personality development as are associated with language and communication arts, basic mathematics, basic science (physical, biological, and social), and how to cooperate effectively with other people. These are good in any occupation, as well as in political life and individual social life.

Training, on the other hand, could be considered as a process of instruction and learning which prepares a person to do a specific task or set of tasks such as those which make up a particular job or occupation. The difference between education and training, then, hinges on the degree of specificity. The boundary between them is not sharp, but gradual, like that between hot and cold water.

The Allocation of Responsibility for Education and Training

A general model for thinking about occupational education and training was proposed by Dr. Staley in his preliminary Planning Document. According to this model, occupational preparation would ideally comprise four main phases or stages which would emphasize in turn:

1 - general education,

2 - general education plus pre-occupational education,

3 - job-entry training plus further education,

4 - career-long further training or retraining, plus further education.

Dr. Staley proposed that the first two phases, which emphasize general education, should be regarded as the primary responsibility of the formal school system; while the last two phases, which emphasize training, should in their training aspects be the primary responsibility of the employment system (meaning all public and private employers). However, in the areas where education and training merge, there must be close cooperation between these two elements of society. The school system will need accurate information and help with its pre-occupational education, and the employment system will need assistance in certain aspects of its training activities and especially in the concurrent provision for the further education that should accompany training.

The Workshop gave much attention to the "second educational system"--the great variety of learning experiences outside of formal education which serve to improve the competence of working people at all levels--and to the concept of an institution to undergird this system. This institution, which came to be called the "OTO" (occupational training organization), was seen as a mechanism designed to build up and improve the second educational system and to act as a link between the diverse elements of the employment system and the system of formal education. To be effective in this function, it must necessarily draw its support and its membership from a wide community of interests including employers, labor, educators, and government. The organization and operations of such an institution will be covered in detail in Section III, together with a discussion of existing OTO's in Latin America, the United Kingdom, and Tunisia.

General Education as Preparation for Life Work

Although the principal focus of the Workshop was on occupational training, considerable attention was necessarily given to the education which must precede training--and accompany it--if the training is to be as effective as it should be. It was rather quickly agreed that general education, since it is a social and cultural benefit to the country, is a governmental responsibility. It is normally financed out of taxes and should be provided for the entire population; at least this should be a goal of any national development plan. In a certain measure, general education could be considered a substitute for occupational training. The more education a person has (within limits), the more easily and quickly he can be trained to do a specific task. It was also recognized that the more rapidly technology changes, the more important it is to concentrate on teaching children how to learn so that they may more easily and quickly absorb necessary future training and retraining.

Perhaps the most important consensus emerging from these early discussions was the strong conviction that whatever the amount of education given a child or young person, it must acquaint him with the world in which he lives and will live, including the workaday world. A recurring concern was the importance of doing a much better job than is being done anywhere now of informing the young person of the occupational choices which face him. Much more job opportunity information and vocational counseling needs to be given than is at present available, even in countries with an advanced economic system.

Mr. Levine thought that a more adequate supply of information about the nature of our employment system at grade school level would have contributed much more to the ability of his children to face the world of work than the courses offered them in homemaking and woodworking. He felt that a good occupational information flow may turn out to be a much more effective means of helping an individual to choose his occupation--or at least his occupational area--than the usual devices of aptitude tests and interest analysis based on the small amount of information now available to the average child. Although such tests are necessary, he felt the role of occupational information is much underemphasized in the U.S. educational system. This is doubly regrettable in view of the vast amounts of occupational information already available from Federal and State Departments of Labor and many other agencies. Mrs. Pedraza suggested that a reformulation of social studies programs to include this information would be an approach to solving this problem.

It was generally agreed that training for specific skills did not belong in the field of general education. However, Mr. Zaidi made the point that in certain cases where only a very little education is available, pre-occupational education may in fact be occupational education. For instance, elemental information about the effects of sun, water, and fertilizer on plant life really becomes occupational education for a farm child, especially if he gets no further formal education.

Thus, a more adequate general education at the lower levels is important in preparing the child in either a rural or an urban environment to choose his life's work so as to maximize his satisfactions. It is also important because it enables him, both physically and psychologically, to more easily absorb the training for whatever vocation he may have chosen, as well as the retraining which a rapidly changing world will make necessary.

The Limits of Choice

An issue emerging early in the Workshop was whether, or to what extent and in what ways, rural education should differ from urban education. This quickly led into the broader issue of the relation between early occupational orientation in education and freedom of occupational choice:

Mr. Ennaceur: I don't think the government alone should be responsible in any country for saying this person must go into agriculture and that one into industry. I do not think it is right to say that we must have a program of education in the rural primary school such that the people will go into agriculture. How can you guarantee that after 10 or 15 years these people will not feel themselves quite unhappy? How can you make people stay when they have not freely chosen this option?

Dr. Skapski: Let us assume for a moment that we have what I call "saturation education" and everybody has been educated according to his abilities and aptitudes. Everybody who wants to be a doctor is a doctor, and everybody who wants to be a farmer is a farmer. Ideal condition! But pressure of external circumstances also has to be taken into account.

Mr. Ennaceur: I agree that choice must be altered by external conditions. But if we accept the point of view that governments are responsible for orienting people's choices, I am afraid that the victims will be exactly the people who by chance were born in a rural or agricultural environment. The tendency is to say, "Your father was a peasant; you must be a peasant." This is absolutely wrong. We must give equal chances to all the people from any economic activity, and from any place where they are born, to be what they can be.

Dr. Skapski: A word of caution. Of course, we would like to see everybody educated according to his abilities, aptitudes, and interests. This, indeed, is the goal of democratic education. But even if we had all the money and teachers for doing this, we would find that there are restricting external conditions that would make it impractical. Suppose we did educate as an engineer everybody with abilities and interests to be an engineer, the same for lawyers, and so on, at all levels of education. Will there be jobs for all the engineers and lawyers we have educated? Will manpower demands be equal to the supply provided by such idealistically planned education? No! There must be a compromise, enforced by the external conditions. And, most fortunately, human abilities, aptitudes, and interest are flexible enough to accept such a compromise so that even with a reasonably restricted choice people will be happy in an area of their second choice.

An example from real life: If we had given Nigerian boys free choice in their post-primary education ten years ago, all of them would have chosen grammar schools. Practically nobody would have chosen to become a technician or a craftsman. Craftsmen training institutions in some regions had to pay trainees to get them to attend their courses. At present, seeing that secondary education of purely academic character does not lead to any gainful employment (it did lead to employment in various offices ten years ago), the boys apply for admission to craftsmen training in numbers about ten times the number of available places.

I submit that we should provide the opportunity for education and training according to abilities and aptitudes, but we should do it within reasonable limits dictated by the external opportunities; and we should keep the youth aware of existing opportunities through career orientation, guidance, and counseling.

Lady Williams: May I say a word in support of Mr. Ennaceur's statement, because I think he introduced an extremely important principle? Obviously, freedom of choice is limited by external circumstances. You can't be a doctor if no one's going to pay you to be a doctor. But the important principle that Mr. Ennaceur has raised is this: "How far, if we're thinking of giving an occupational orientation to pre-employment education, are we not in fact creating an external circumstance which takes away the freedom of choice a person ought to have?"

Mr. Levine: I don't disagree ... but the reality is that the majority of children in newly developing nations do live and are going to live most of their lives in an agricultural environment. And when you take the principle, which I firmly believe in, that you must educate the child for his environment, I don't see any alternative but to put a great deal of occupational content into the primary grades. That is going to be their only exposure to education in their entire lifetime! It's not something that I hope will go on for the next 10, 20, or 50 years. It's just the reality that we face today.

Mr. Ennaceur: I agree with you, Mr. Levine, that it is a reality. But it must be a dynamic reality! It must be a static reality! I mean that for us, a developing country, our situation now as an agricultural country must not be a permanent situation. We don't accept it! We are progressing, and we need and want to be industrialized. So I agree with you in a certain way, but we must not forget our future--our near future and our far future.

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Dr. Quirolgico spoke of the inherent right of the human being to develop as an individual--of the need to strike a proper balance between the necessity for the individual to be left on his own and at the same time be put under the constraints that society must demand of him. He observed that there is a place for an emphasis on the educational institution's responsibility to develop the individual solely as an individual; but, on the other hand, schools must also recognize the fact that--if society is to be an active, developing organism--there must also be a responsibility to shape the individual to meet the occupational needs related to development.

Analyzing the Needs for Occupational Education and Training

Manpower Planning

The critical issues of what jobs people should be trained to do and how many people should be trained to do them came up repeatedly under the heading of manpower planning. It was generally agreed that although quantitative forecasting of manpower needs is eminently desirable, it is a mistake to place great reliance on such forecasts. There are techniques available for making gross estimates that are useful for initial planning, a sort of broad target setting that can answer questions as to whether we are going in approximately the right direction: are we training too many of this kind of worker and not enough of that kind? But accurate, detailed forecasts of manpower needs are not really possible in rapidly changing situations and especially in countries where reliable information on the current employment situations and trends is lacking.

Mr. Levine pointed out that although U.S. manpower forecasters have an informational basis for their projections far greater than that available in any other country, they have made some terribly wrong projections. Even the basic question of how many people there are--to say nothing of how many there will be--cannot be accurately determined in many countries. As Mr. Nikom remarked to the amusement of participants, he could not tell you right away exactly how many nephews he had. It would take him a couple of days.

Even in the very short run, any businessman when asked how many workers he will need--say six months from now--will understate his needs due to the very human tendency to wishful thinking. In this case, he hopes to be able to man his production line or do his job with a few less workers than he will actually need. Mr. del Campo spoke of an instance where his organization made an inquiry into the number of workers industry felt it would need in one year and in two years. After analyzing the answers, it was found that the numbers of workers estimated to be necessary was less than would be required by normal attrition caused by death and retirement.

Rapidity of technological change, as well as the complexity of social and economic activity, makes long range forecasting in developed countries inaccurate, and in the developing countries there is insufficient information on current employment available to allow even short term forecasts. As Lady Williams put it: "I spend a great deal of my time saying 'Do not put your trust in that Manpower Forecasting Unit'."

Mr. Levine pointed out that it is possible to have an institution and a system for collecting current employment information on a repetitive basis--monthly, quarterly, and annually--and by studying this information to tell the employing community more about their manpower needs six months from now than they can tell you themselves. So it was felt that the emphasis in the manpower field should be on the collection of better and more extensive quantitative occupational information about current employment of workers so that existing trends are accurately perceived and then broad targets appropriately shifted.

Occupational Analysis is Pivotal

The collection and analysis of good information about the occupational and employment situation in a country is thus of great importance in educational planning and should be given much more attention than is presently being done. Mr. Levine felt that facts about labor turnover and information as to why and how people are hired and fired in Latin America would be most valuable to their training agencies. Mr. Nikom spoke of the value of knowing more about the graduates of the technical and administrative schools in Thailand--how many were employed and whether they used their training. But it is difficult to get old-line employers to give out such information. Mr. Podesta pointed out that even in the United States we do not have much information on these subjects; the U.S. Employment Service does not know how many people it serves, only the total number of contacts it makes. Mr. Chan's suggestion of a standing advisory committee of employers should help to remedy this type of situation and improve the qualitative, as well as the quantitative, aspects of educational planning.

In other words, it would appear that the entire area of occupational information is vastly underdeveloped. Mr. Levine stated his conviction that it is the occupational analyst armed with what ought to be an abundance of occupational information who should occupy a pivotal position between education and training. This person--appropriately housed in an occupational training organization--really should be the link between the formal system of general education and the employment structure and should conduct a dialogue between the two systems, leading to a better accommodation. To the former, he supplies information through the job counselor which will allow students in their last years of education to make sound occupational decisions. To the training organizations, he supplies information as to what knowledge, skills, and personality traits are needed in a given job or occupation--critical data in establishing and updating training curricula, as well as in setting broad manpower targets. Mr. Levine felt that if in the 1930's the U.S. had realized how rapidly occupations were going to be changing, instead of establishing the U.S. Employment Service, it would have established a U.S. Training Service. The job of this organization would have been primarily to create, through a training program, skills necessary to fill jobs and only incidentally to find jobs for unemployed workers. The occupational analyst would be a very important person in this institution.

Dictionary of Occupations Needed

Related to this problem in the developing countries is the need for a dictionary of occupations. Mr. Nikom noted that in Thailand the last census gives no more than three-digit occupational groups. A survey of occupations which is underway has, after two years, yielded more than 1,400 occupations, including many new and unexpected occupations in rural areas. Mr. Chan spoke of the need for developing countries to have an abbreviated dictionary of occupational titles with any widely accepted tests (with local variations where available) indicated for each occupation. This dictionary should be organized with a section on agricultural communities, as well as sections on industrial communities at different stages of development. Related to this should be a vocational guidance system with aptitude and other test material adapted to the country's cultural norms.

Comments on the Philosophy of Learning and Vocational Education

by

Dr. Nathaniel Frank

> Dr. Frank, who headed the Summer Study at M.I.T., was able to spend parts of two days at the Workshop during which he talked informally about the basic ideas behind his projects and explored the concept of "investigative learning."

Vocational Education in the United States has developed over half a century as essentially a separate enterprise from the rest of education. And half a century is long enough to have a real establishment with deep political roots, financially autonomous, and with its own identity which, incidentally, has a very poor public image and--inevitably--a defensive attitude toward those who would like to improve it.

What should be done with vocational education--if I may say it in the shortest possible way--is to turn its philosophy inside out. This philosophy--in contrast to the cognitive development of academic education--has been predicated on the development of optimal skills for doing a specific task or cluster of related tasks. I am thoroughly convinced that there is untapped educational potential in the kind of learning that goes on in a vocational program where a person is given the job of attaining a skill to get something done. However, it will be meaningful as a continuing contribution to a person's education only if the acquisition of skills is not paramount but is simply the by-product of an experimental way of learning in which academic discipline and cognitive development emerge as things necessary to get a job done.

Now we all know that most of the trouble we have with the majority of youngsters in school is that there is a bad mis-match between what youngsters instinctively like to do with their time and what they have to do in school. Given freedom, just watch them. They are active; they are always up to something--even if it is not very good--but they are active animals. They are doing. And when one imposes on them the use of a large segment of their time in a kind of environment which is a prison from their viewpoint, we get rejection. As long as the kind of learning that we feel ultimately will be invaluable for them--the development of cognitive styles, intellectual development, the ability to work with abstract ideas, language and other forms of symbolism--

has no relevance or meaning to a youngster in terms of his instinctive desire, we get rejection. And we know it; we worry, and then we fuss with doing the same things in different ways.

In addition to the kind of learning that comes so successfully from the transmission of the accumulated knowledge of man through books or words in the traditional form, I propose that we should seriously consider having available a second road to learning in such proportion as matches the individual's talents and instincts. And this is what we have called "investigative" learning--a kind of learning in which the learner has an active part in the process, particularly in decision making. Just think of what happens to the average person in an educational program. The decisions as to what shall be studied, the speed, the depth, criteria for excellence, are all made by somebody other than the learner. But put a person in an experimental laboratory situation, with a goal-oriented task, in an attempt to get something to run, to fashion something, or to make a device, some decisions--even though they are small--will have to be made by the person himself. We know he may never get from the starting point to the goal, but that is not the main point.

We all know that real situations, and especially those of a social nature in all their complexity, are situations to which there aren't answers. It is tragic that the basic philosophy of much of the learning people do is predicated on the idea that to every question there is an answer. Most real questions have no answers. They have a range of more or less acceptable limits within which one hopes to find a satisfactory mode of operation. I think we might expand on this theme to question whether we teach the right kind of mathematics. Even the so-called new mathematics, in spite of its revitalization of the understanding process rather than rote memory, still largely deals in situations where one asks, "How do you get the answer to this question?" The mathematics of approximations, mathematics of upper and lower bounds, mathematics of inequality--all of these--are far more relevant to decision making.

I think we've suffered from a great oversimplification in believing that application of fundamentals--applied science, applied mathematics--are the keys to creating operational competence. You can't do without it, but by itself no amount of so-called fundamental knowledge can carry you to an adequate solution of a real problem with all its complexities, for in most cases we don't even know the variables that have to be taken into account.

You know how common it is even in our sciences (for example, in biological sciences) to do a control experiment. Everybody says, "Sure, it's natural." You want to find out what happens in a living organism when you do something to it. You take a pair of them, or a number; some you treat, and some you use as controls. Why do you feel the need of the control? The reason is that you don't even know for sure what variables may be influencing the results, and you are scared that some unknown, hidden variable will falsify your interpretation of the observations. Now if that happens in a science, what happens in a real situation? After all, a scientific experiment is an artificial observation in which you have carefully excluded the things that bother you. This is really what an experiment is.

And so what I am pleading for is a realization that if we are concerned with preparing people to cope with real situations in which decisions have to be made, we have got to do something more than transmit to them the wisdom of the ages.

Now this really is the central theme of what we have tried to evolve in our Summer Study:[1] a plea to embark on a program in which the opportunity for this kind of experiential, experimental learning is made available to students, as well as the accumulated knowledge of man in the discipline form. And we must remember that, after all, this accumulated knowledge of the human race has been put in man-made packages of what we call "disciplines." They are not natural divisions of experience.

Now there are good reasons, which I cannot take the time to explore, why the disciplines exist. But it is a curious thing that the kind of education pattern we have evolved for the very early years (the elementary classes) is pretty much unstructured. The child plays and deals with many things under the guidance of one or two teachers. Then, starting with junior high school, something happens. Education becomes a series of parallel channels called "disciplines," and this persists right through college. Then what happens to the pattern and structure of education when someone wants to develop professional competence in graduate school? You abandon the traditional curriculum form with its set of disciplines, and you undertake a research endeavor in which you have to get a job done. To try to forge an answer you bring to bear everything, including your intuition, your judgment, your experiences, and the feelings you have about things that are almost impossible to verbalize. So it is with any vocational practice, because professions comprise simply a subset of the broad spectrum of all vocations. (I insist, when I'm asked, that I come from a vocational school. I get a good deal of polite acquiesence, but nobody really believes me.)

And so, somehow or other, in spite of the convenience and safety of single disciplines, I feel we must face up to the task of non-disciplinary learning. I did not say "inter-disciplinary." I said "non-disciplinary" or "a-disciplinary" learning. I look upon the Richmond

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[1] See end of section for abstract.

Plan[2] as an attempt to start coupling what have been separate subjects and to put them together into something which has a common objective underlying it. This is the hard first step.

We talk about team teaching. Fine, but I think even my colleagues in the Richmond Plan where it is an integral part of the process will admit that the interaction among teachers is largely at the verbal level. They try to understand what the others are doing and make their efforts compatible and related. I feel we have to aim for something more effective in which every teacher in a cooperative group has to not only have an area of proficiency but also a literacy in the areas of competence of his fellow workers. This is no easy task, because we educate teachers in the pattern of acquiring an area of competence. And it is terribly easy and comfortable to retire behind the walls of English, if you are an English teacher. I'd love to see every English teacher have to do something manipulative. It really would be an experience that might enrich his perspective; and English does have something to do with the world of communications.

We've fallen into this pattern of easy subdivisions of complex problems into what we hope will be independent fields. They refuse to be independent, and then we find ourselves in trouble. But if we look at the practice of vocational education--e.g., if somebody has to learn how to make a machine run, and run effectively--we find a goal-oriented task. The way it is taught, unfortunately, is simply to transmit the skills that others have developed in order to make this happen. The end point is the acquisition of the skill. All the related academic subjects of vocational programs are inwardly directed to help strengthen the skill. If skills are the proper objectives of this plan, that is fine; but it must be recognized that skills have a remarkably and increasingly short life-span. The life expectancy of skills today is getting shorter and shorter in a frightening way. It has been said that half of the jobs that people will be doing in a decade or so don't even exist today; and preparation for two or three decades of useful contribution to society really should do more than prepare people to be retrained continually. So that is why I say we ought to simply invert the process of vocational education and have the doing of things lead and generate the need for conceptualization, rather than trying to apply concepts generated by somebody else to the skill of doing a job which ends with the skill.

Now if one assumes that this is a pattern worth developing, a host of problems arise. One of the problems is forecasting in a sensible and meaningful way what will be the emerging requirements for human functions in a society which is being pushed madly and driven by technological change as we have never before been driven. I would submit that the pattern of trying to forecast job requirements is a hopeless exercise. It is just not possible. Quite apart from the multiplication in numbers and varieties, the job descriptions, if one looks at them, are descriptions of techniques more than of missions.

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[2] See Section II, Part 4 for a discussion of the Richmond Plan for pre-occupational secondary education.

Taking the development of some sort of proficiency in technical and technological education as a central theme--whether it be for technicians or for engineers, or at any level within the attainment of our technology (the process by which we change our physical environment) --then I submit that the whole pattern of education for technical competence is wrong. It is based on the philosophy of common techniques. Thus, we have electronic technicians, we have nuclear technicians, we have engineering technicians, we even have laser technicians. Now, as I have said, the techniques will not survive, but something does survive in the social purposes of human activity, and they are the functions that are important to society. I would propose that we had better recast the main themes in education in terms of those functions which are foreseeably long-lived in terms of social need, rather than in terms of the methods by which you accomplish certain tasks.

For example, energy: its conversion and use. There are going to be energy demands for all sorts of purposes from the most primitive to the most sophisticated for a long time to come. The techniques by which man has learned to control, to transform, and to utilize energy keep changing. But these changes are part of a central story that carries on through. Techniques will be modified and evolve, but in the context of something that has greater longevity, such as communications, transportation, working with living systems, materials and their processing. The techniques keep changing, the understanding changes; but people are going to continue to use materials, so there are central themes. And this, I think, is the real challenge to education: to get out of skill-oriented into mission-oriented programs of instruction.

Now one last thing--very closely related to a section I was delighted to find in Professor Staley's report. (It is nice to find somebody whose ideas are compatible with yours; then you say he is a great man.) He calls it the "second educational system." This is something I've brooded about, written about, and talked about. I want to put it in this context. There is a real problem in the relations between research and the development of new ideas on the one hand and, on the other, the application of these new ideas to fashioning a product, whether it is a human product or a physical product, and to its use in actual operations.

During the Second World War my institution worked on the development of radar. In the laboratory, of course, there was research. Then we developed equipment and had field trials. These are also the things you do in developing educational programs: you try them out in the field, get feedback, evaluate the field trials, and you say, "Great. Now what?" If these new ideas are going to have an impact on the nation, they must somehow or another get into the operating system. This is a massive job.

You know the telephone company doesn't work by taking ideas directly from the Bell Telephone Research Laboratory into public use. There is a big company called the Western Electric Company inbetween. The problem of making the transition from research and development to practice is a very complex and difficult one and merits separate organizational entities.

The problem of preparing people to make the transition from formal education to being successful practitioners in the social arena is something which is handled in the most heterogeneous, helter-skelter fashion. For the secondary schools, when the kid goes to college, the problem is deferred. And the school authorities feel comfortable. They are taking care of the transition--they've got the kid into college--no more problem. When a youngster leaves high school, not to go on to higher education, they also breathe a sigh of relief. That doesn't help solve the transition problem. Professional schools, of course, have long been concerned with this transitional problem. For example, placement activities have become an integral part of their operations. We could go through a list of all the various devices used in our colleges and training institutions.

I submit that there is great need for organizing as big an effort for seeing to it that people who have had as much benefit as they can derive from school education make a successful transition into working, operational competence. And I would propose that we think very hard and maybe experiment in generating what I might call (for lack of a better term) a half-way house, a bridging operation that will really remove the discontinuity between the relatively isolated sort of competence that comes from learning and the practical sort of competence associated with operational proficiency.

You know that academically-inclined youngsters, even when they are successful in school, come out with precious little understanding of the limitations of their learning. They may be extremely good at what they learned; but seldom do they know what are the limits of applicability of their knowledge. When do you have to stop trying to employ only what our very limited human knowledge can give us and go to experimental trial guided by fundamentals?

Now there are all sorts of people worried about this. I have found in my travels and investigations that my ideas are invariably modifications of someone else's ideas. But I am concerned about the proposals that I have seen. We have transition operations in employer groups. There are companies that do on-the-job training for their specific needs.

It has been proposed that we need skill training centers so that the student emerging from education (which presumably lays a base from which they can grow into occupational competence) can learn the specific things that are needed for specific employment at every level. The trouble with this is that, because of the character of industry and employment, the kind of training that has to be given there, to be economically justified, has to be short-range to satisfy the needs of the operation.

But if you put the skill training into the hands of educators alone and have career development centers where educators take the lead, I am afraid that generally they just cannot keep up with employment requirements. They are not cognizant of what industry's needs are or what the evolution is.

I think we need a new institution with a new kind of staff which is a mix of employers and educators, working as a really coordinated team. Employers could see to it that obsolete equipment is removed and bring in their own new equipment for special training tasks. The conceptualization and cognitive learning which would be concurrent with the skill training would be in the frame of reference of this skill training.

There would be several advantages from this kind of bridging institution. In the first place, the schools would be enormously helped. There would be a continuous flow of information from actual employment needs into the schools, and the problem of obsolescence in vocational training should be overcome. Secondly, just think how comfortable it would be for an employer to watch how people perform and be able to preselect those whom he could hire with some degree of confidence? So I see some mutual advantages. I think this is worth some consideration, and it is very close to what Dr. Staley had in mind when he said we do need to worry about a second kind of education, perhaps, other than the traditional type--one that does make this transition.

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A Discussion of the Philosophy of Learning and Vocational Education

The following day Dr. Frank was asked to elaborate on his speech which had been of great interest to everyone. He noted that the Richmond Plan is just a very tentative beginning in a departure from the traditional isolation of separate subjects in the learning process and a first step toward an approach that starts to have coupling and interaction among the various disciplines. However, in his view, it begins from the wrong end. The Richmond Plan involves an infinitely difficult effort to synthesize an organic whole out of initially separate pieces with roots deep in tradition and habit. The problem should be tackled from the other end, looking at the mission as a whole and bringing to bear all the inputs from disciplines and getting out of it again necessary conceptual growth. This will require the best talent in the country and resources far beyond what is available at schools where the Richmond Plan is operating. Expecting these teachers, by themselves, to produce a truly a-disciplinary curriculum is asking them to bootstrap themselves out of their own educational level.

Investigative learning, in which there is personal involvement in the learning process, has already become a major component of engineering education through the project laboratory. Here the student tries to make sense out of a situation by striving toward a goal. It is a good vehicle for learning, adaptable for use at any age from very young to very old. If sophisticated questions are asked, it will allow one to move to the very edge of human understanding. In this type of learning, the student can realize that the accomplishment of a given goal is not synonymous with getting the one right answer. There are ranges of acceptability and, also, cases where the goal cannot be reached.

In addition to scholarly knowledge of fundamentals, society requires practical experience, instinct, and judgment to move forward. A very small portion of the things we do every day are derived from our formal education.

Educating for Technological Change

The big change in man's environment--his utilization of nonliving sources of energy--has brought to the fore critical problems of control. Instead of supplying the energy by his labor, he has increasingly become the guardian who must be concerned with judgmental controls. Now the computer has arrived to free man from mental drudgery as the machine freed him from physical drudgery. This bears heavily on the kind of functions humans will perform in the future, and it is disturbing to see young people being trained for jobs that will not exist.

Conceptualizing Becomes Increasingly Important

Whereas previously man's tools were simply extensions of his physical powers, the active components of many modern technological operations are no longer available to the human senses. In the whole field of electronics, one cannot touch, see, or feel the things doing the work. One sees the indirect effect of hidden things at work, and to be comfortable with this device--to design, operate, service, or maintain it--one must be comfortable with conceptual ideas which were formerly reserved largely for the scientist or scholar. Because of the apparent characteristics of most people, who feel most comfortable going from the tangible to the abstract, we must insure that the learning process has a very tangible starting place with tangible things which can lead on to the possibility of conceptualizing.

The great problem of universal education in this country is to allow each person to develop as far as he can. When individualized, experimental, investigative learning is coupled with the academic method, each person can get the mixture appropriate to his talents. Those who tend to manipulative skills will not be left with just manipulative skills but will be brought the necessary conceptual growth. Those who do flourish in a more abstract conceptual atmosphere--the traditional good student in the classroom--will have a mixture of the kind of learning that reminds him that ideas do not spring forth full blown; they evolve from things we do and observe. Acquisition of skills must be open-ended, not enclosed. It is not necessary to deny a person the acquisition of working skills because he is getting educated, or vice-versa. Through investigative learning, the acquisition of skills can lead also to intellectual growth.

One can capitalize on the processes, systems, and materials that comprise the environment of children as the vehicles to get them into the learning process. In urban areas one can take advantage of urban systems by trying to understand what happens, for example, when the water tap is turned on. If this technique is done properly, it opens the doors to almost every phase of human activity from meteorology through physics, chemistry, engineering, economics, politics, bacteriology, the distribution system--what have you. It is enormously rich in possible outcome.

Educating for Social Change

We have the responsibility, Dr. Frank suggested, to explore whether or not--working investigatively--a person who begins to understand how he can change his physical environment can be led to the more complex task of becoming concerned with the corresponding social change. People who have been concerned with technical advance have become today more concerned with the social responsibilities of emerging technology. What are the implications for social structures and human well-being of new ways of manipulating our environment?

Dr. Quirolgico commented that experience introducing new strains of corn and modern farming techniques in Mexico and Taiwan shows that--at least in these very traditional rural societies--the success of the investigative approach is limited. To get the full benefit of technical knowledge, farmers must be obliged--not just encouraged--to adopt scientifically-proven methods.

Dr. Frank felt that such a defensive, emotional reaction to new things is to be expected from a traditional education which fears the unknown. This attitude will change gradually as people are brought up to feel that it is no disgrace to face a problem and not find an answer. One has to find sensitive points of entry--small things--and then drive in wedges that can expand. Too many people have the oversimplified notion that a core of solid learning exists which is good for everyone. Not true!

Lady Williams felt that in view of the enormous change in social relationships which lie ahead, the real job is to develop the inquiring, critical mind that can search out explanations for itself while realizing that any given explanation will be modified by this constant change. One tries to develop minds which can solve ten-years-ahead problems as well as present problems.

Dr. Skapski commented that it was neither possible nor desirable to completely "program" human nature for future change and that meeting challenges is the story of human development--but that young people can be psychologically prepared to meet the challenge and not be afraid.

Dr. Pinkau pointed out that the U.S. and other industrialized countries with a high degree of educational specialization are failing to train their young people--especially in tertiary education--to become sensitive to social problems and components of their environment. She wondered whether a VISTA-type service of one-year duration as part of a university curriculum and requirement for graduation might be one way to educate for the process of social change.

She cited the practice in Ethiopia where all students at Haile Selassie University are required before their graduation to serve one year in villages as teachers or as rural development workers. In Iran part of the military service is turned into development service (the Education Corps, the Health Corps, and the Rural Extension Corps). Graduates, mainly from secondary schools and universities, are selected for one of these services in order to acquaint them with social and economic problems of their own country, thus meeting the needs of rural development. After six months of basic training (about 20% military training and 80% development training) they work for 18 months in villages in one of the above-mentioned three types of services. The Education Corps, for example, has provided regular primary schooling in 23,000 villages since 1964. From these Corpsmen, the most promising are selected for further education and employment as regular teachers. Here a special service combines a "sensitivity training" addressed to social problems with career training for further employment and uses this manpower to meet the specific needs of rural development.[1]

Dr. Frank felt that such experiences in reverse would also be valuable--with the teachers periodically returning to the university for refresher courses. He cited the great danger in this increasingly technological world with its ever greater demand for professionalism that we may produce people of such narrowly specialized education that communication becomes difficult. Although it is not possible today, as Mr. Carvell pointed out, to produce a generation of generalists or "Renaissance men," we must aim at education at every level which will go beyond intense specialization and provide enough depth and overlap to permit human interaction. Two desperate needs of current U.S. education, he felt, are a decentralized management structure staffed by first-rate professional administrators and an involved citizenry which is convinced of the need for evaluating for themselves what education might be and what values could be derived from it.

In answer to Mr. Carvell's question as to whether the school can change society as well as reflect it, Dr. Staley pointed out that this certainly is taking place in a very drastic fashion in some countries (such as Nigeria) where, instead of school and society evolving together as in the U.S., the school brings very sophisticated scientific and technological elements of world culture into traditional subsistence village life. This can create a potentially explosive social situation when a "modern" education raises individual aspirations which the economy of the country cannot fulfill.

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[1] See Dr. Pinkau's paper at the end of this section.

B. Related Workshop Papers

FINAL REPORT OF THE SUMMER STUDY

ON

OCCUPATIONAL, VOCATIONAL AND TECHNICAL EDUCATION[1]

ABSTRACT OF THE SUMMARY REPORT

The challenge faced by the study was to a large extent that of finding answers to the following question: What patterns of education will best prepare American youth for useful, satisfying, and gainful work at the termination of formal schooling?

Despite a wide divergence of backgrounds and interests of the one hundred or so participants in the study, substantial agreement was reached on a working philosophy and on a number of major recommendations for action. Practically at the very outset of the study there emerged general agreement that any significant innovation in and improvement of occupationally and vocationally oriented education should be aimed not merely at current vocational programs but, more importantly, at the great numbers of students who fail to succeed in college preparatory curricula and are not engaged in standard vocational education. Thus, it became evident that any fundamental attack on vocational education would of necessity be directed at all education.

In attacking this general problem, a great deal of attention was brought to bear on the feasibility of introducing into educational practice new patterns of learning designed as an alternative route to higher education from those now existing. These are characterized by student involvement in investigative learning for occupational goals and involve working with materials, systems, and processes as the points of entry for both intellectual and manipulative development. Concern about the status problem, that is, the early rejection from college preparatory curricula, along with the discontinuity in education patterns at the beginning of junior high school, led to the conclusion that this level would be desirable for an introduction of the new patterns of learning. Furthermore, great emphasis was placed on the need for the organization of a body of "clinical" knowledge that synthesizes the empiricism derived from "doing" with the abstractions and principles of traditional academic disciplines. The great variation in individual student requirements for involvement in the development of skills and in academic opportunities led to a study of how a curriculum might be organized to meet adequately these dual objectives. Tightly coupled to the need for generating new curriculum materials and learning aids lies the critical problem of teacher education, both in-service and pre-service. Programs of teacher education and curriculum development are so inextricably intertwined that they must be made part of a single innovative effort. Because of this and the equally intimate interrelations with many other components of the educational process, such as testing, counseling, and administration, there emerges a clear need for the pooling of the necessary resources in central locations where a total development could be carried on effectively. Other necessary functions would benefit by being part of the operations of such multipurpose centers.

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[1] The Summer Study of Occupational, Vocational, and Technical Education was held July 6-August 13, 1965, at the Massachusetts Institute of Technology in Cambridge, Massachusetts, under the direction of N. H. Frank, Professor of Physics. The project was supported under a Contract between the Science Teaching Center, Massachusetts Institute of Technology, and the U.S. Department of Health, Education, and Welfare, Office of Education (Vocational and Technical Education Contract OE-5-85-135, Vocational Education Act of 1963, Section 4c).

The rapid change in both character and scope of the requirements for effective educational management emphasized the need for the creation of institutes of educational management of character and quality needed to prepare people effectively for the emergent needs of such management. In addition to the foregoing, attention was focused on the large and critical problems of the special educational needs for deprived areas. Also the problem of recommending changes in the objectives and practices of apprenticeship programs led to the desirability of making them primarily vehicles for continuing education. The dual requirements of great diversity and of coherent coordination in education, as well as the very tight coupling among all the components that are involved in an educational operation, made it clear that effective innovation should be tackled as a systems problem rather than as a series of independent improvements of individual ingredients.

Out of the composite efforts of the working groups of the summer study emerged substantial agreement on a number of basic issues. These are in essence as follows:

First, there is need to treat vocational-occupational education as an integral part of the common core of all education. Consequently, education should be concerned with all the capacities of an individual, including the intellectual, the manipulative, the creative, and the social.

Second, current vocational education should be expanded and generalized so that working with materials, with systems, and with processes provides a base for intellectual growth along both traditional academic and vocational paths.

Third, some of the new vocational education should be part of the educational experience of all students and conversely, some of the classical disciplinary type of education should be part of this experience.

Fourth, there is need, early in a student's schooling, to replace the traditional division of education into separate disciplines by an educational pattern in which current categories of subjects are not readily identifiable. This should be initiated at the beginning of the junior high school program. Such an operation will use as central facilities shops or working areas such as laboratories and will call for the development of a new kind of cooperative group teaching effort.

Fifth, the junior high school pattern of experimentally and experientially based education should evolve continuously into a few broad but closely connected avenues of education in senior high school. These should have no terminal educational goals, but rather the new programs should provide foundations for continuing education whether it be on the job or in formal post high school curricula.

Sixth, education for vocational competence should build in flexibility and adaptability to produce transferable knowledge and skills. Since formal schooling can at best provide but part of such competence, all relevant resources of society should be utilized to strengthen this educational process. The rapid change of skill requirements, both in character and in degree of sophistication, indicate that the benefits of current vocational education can best be derived at the post high school level, in parallel with the education offered by technical institutes and junior colleges.

Out of the forestated considerations and other findings of the summer study came a set of major recommendations for action. These in essence are as follows:

First, it was recommended that there be initiated a program of development of new curricular patterns and instructional material of the type previously described for all students, beginning with the start of junior high school. This point of entry recognizes the potential of existing curriculum reforms, such as those embracing elementary science, mathematics, English, and social studies, that are now being introduced at the elementary levels. It was further recommended that, simultaneously and as part of the preceding process, teacher education projects be initiated that are aimed at generating competence in cooperative group teaching with the new materials and attitudes that have been proposed. Also, the establishment of a national system of multipurpose educational centers was recommended. An additional recommendation was aimed at the initiation of a program leading to the establishment of an institute of educational management, patterned after the best schools of industrial management and business administration. For the problems of deprived areas, it was recommended that a program for the development of special educational patterns be initiated. These would be characterized by a sizeable body of tightly interlocking work-study experiences with heavy civic and community involvement, reflecting the apparent present urgent and relatively early need of students from these areas for gainful employment. Finally, it was recommended that projects be undertaken to strengthen and broaden the apprenticeship programs of labor, of industry, and of government. These projects should aim primarily at the continuing education of apprentices capitalizing on the development of skills as a means for such education. These programs could generate effective roads back into further formal education with advanced academic standing.

RANDOM THOUGHTS ON THE ROLES OF GENERAL EDUCATION TO SUPPORT ECONOMIC, SOCIAL AND POLITICAL DEVELOPMENT

by

Nikom Chandravithun[1]

I agree with Professor Staley that "the economic, political and social aspects of things do not exist separately in the real world." And in the real world politicians especially should have the skills required of legislators, ministers, and others so as to be able to serve the national interests well. This is essential because a politician can overnight find himself placed in charge of, for example, the Labor portfolio of the government. Thus, he is suddenly responsible for something as important to the nation as its development of human resources which deals with the life and work of men in the world of work. He must then ask himself the question, "Have I the occupational training and professional equipment even to understand what the country needs insofar as human resources development is concerned?" Very often he has to acknowledge, if he is honest, that he cannot even qualify as an amateur in that particular field. This situation can and does occur in almost all high level government positions. Thus, in a very real sense, politicians are in great need of sound occupational education and training skills for they are the policy makers deeply involved in setting the tone and pace for governmental machinery.

The woman who is the mother of society and in fact the maker or breaker of future generations and posterity, needs as much, or an even greater degree of professionalism for homemaking and bringing up children. In fact, the greatest need is to arrest the drift of women from homemaking to careers outside the home, which in one sense is perhaps the greatest contributing factor to youth indiscipline and all its resultant tragedies. I would go one step further and say that in the social field there is need for education and training for both men and women to teach them how to be better fathers and mothers so as to usher in a generation which will provide the most lacking commodity of our modern world--PEACE. In spite of all the progress and advancement of man the average individual of the twentieth century lacks peace in his heart. As a result no one really knows what he or she wants, thus there are few values in life, nothing to cling to, nothing to cherish--just turmoil, confusion, and a vacillating temperament which cannot settle for anything. If we talk of occupational education and training and if we accept that in real life the social and political fields are as important as the economic then we must think of education and training in terms of an individual's complete lifetime activities.

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[1] Deputy Director-General, Department of Labour, Bangkok, Thailand. Formerly Professor of Labour Administration, Thammasat University; Member, National Research Council of Thailand.

Where and when does the education and training start? From the child's birth the mother and father must assume with parenthood the roles of trainers and educators--roles which, incidentally, they, the parents, will be expected to play for the remainder of their lives. While the school authorities take over part of the child's training during the normal school hours, the parents remain the primcipal educators since the child spends the majority of his day, approximately 16 hours at least, with them.

When the child completes school and enters either a college or a vocational and technical institution, the vocational preparation process commences in earnest. In most countries proficiency and expertise in vocational preparation is reaching a stage whereby we can say that the process is reasonably satisfactory, in that the child studying engineering assimilates enough technical know-how and knowledge to make a satisfactory engineer. Similarly, a child studying medicine or economics is capable of knowing his or her subject as an economist or medical worker. Where the college has failed is to develop the child into a good citizen. WHY? Because most colleges and teaching institutions pay little, if any, attention to what the student does in his spare time.

The discussion leads us to the making of one basic decision: do we accept that the most fundamental aspect of occupational education and training is to make man a better citizen? If men and women are better citizens, they will be loving and effective parents. If they are effective parents, the child is assured of the right type of training and education both at home and at school and the whole system gets into a cyclical and continuous process which cannot but produce the type of persons we require to develop economically, politically and socially, and so make the world a far more pleasant place to live in than it is today. If we endeavor to translate this viewpoint into something concrete, we must ask ourselves the question, where do we start? Can we train persons entering parenthood to give the first impetus to their coming progeny? I would say not. The parents are ill equipped and have gone past the stage of receiving fruitful education and training in parenthood--or crudely put, they have missed the bus.

Then where do we start? Launch a campaign at the kindergarten stage and then continue so as to train the education profession at all levels. Let educators be adequately prepared to teach and inculcate 70% of good citizenship and 30% of their normal subject. Recognize once and for all that the most important profession of our day is the TEACHING

PROFESSION. Upgrade it in quantity, in quality, in status, in emoluments and attract the finest brains of the country, not only at the university and post graduate level, but at the kindergarten and Montessori level.

Let us be realistic and face facts. Because of the very poor substandard wages and amenities offered to lower level educators in developing countries who in the national manpower pool is left to join their ranks? The boy or girl who tries almost every other profession (the more lucrative ones at least) and then in utter frustration, and like a drowning person in the ocean of life, clings to this last straw --the job of primary school teacher. What is therefore the average product emerging from a primary school? Certainly not a child adequately equipped to be a good citizen. The children go from stage to stage in the process of education and training getting "big ideas," but not necessarily the type of ideas which will result in a happy life. Thus money making, becoming affluent and rich, becomes the major objective. And only 20% of all children, if that, are able to secure "good" jobs which provide the level of monetary returns desired--even in developed countries. The remaining 80% are unhappy, frustrated persons who ride roughshod through life. Why? Because they have never really appreciated that it takes all sorts to make life. We must have our doctors, scientists, and business magnates, but we must also have our humble and less paid tillers of the land, our shoemakers, our dairymen, our taxi drivers--and others in a very large variety of lower paid jobs. We must learn to appreciate that everyone cannot be rich, everyone has not the brains to be a scientist or doctor, but everyone can certainly acquire peace of mind, contentment, and happiness which are, after all, the end-products of living, and are not just a monopoly for the rich and clever.

The poorest, humblest citizen can be as happy in his hut as the rich man in his palace provided we can contain the plan of life. And this only comes from the right type of education, right from birth, so that we can appreciate the values of life, inculcate nationalism, dignity of labor, pride in effort not in result, and measure success in terms of peace of mind and happiness, not in terms of gold and dollars and automobiles.

THE ROLE OF VOLUNTEER SERVICE PROGRAMS IN THE DEVELOPMENT OF HUMAN RESOURCES

by

Irene Pinkau[1]

Summary

This study emphasizes the role of volunteer service organizations serving within their own country in the development of human resources. Such organizations operate in the fields of education and employment as informal institutions, side by side with the regular domestic systems.

Volunteer service programs described in this paper emphasize social and economic development (in contrast to youth work), are national government supported, organized as governmental, private, or mixed agencies on a nationwide scale, and operate in long-term programs (six months or more) in full-time or part-time activities within their own country.

This memorandum is an excerpt from a study originally made to prepare for the World Assembly Meeting of the International Secretariat for Volunteer Service held in New Delhi in March/April 1967 for outlining the main contributions of those services to social and economic development. The portion of the analysis which deals with export volunteer service programs (like the Peace Corps and the more than ten other European services) is not mentioned here, as the focus is on the efforts of developing countries to strengthen their own human resources development.[2]

Volunteer Service Organizations are established as flexible institutions to operate on the domestic scene in education and employment on a nationwide scale, to meet special needs of national importance. The main efforts may be summarized as follows:

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[1] Director of Research, International Secretariat for Volunteer Service, Washington, D.C.

[2] Further information about volunteer service programs can be gathered at International Secretariat for Volunteer Service, 1424 - 16th Street NW, Washington, D.C., 20036.

1. General education and literacy of youth in a rapidly growing population to meet the needs of the nation's education during the transitional phase until the regular school system is able to fulfill the task.

2. Manpower training, through vocational and technical education and work programs in accordance with manpower requirements to provide a pool of trained manpower for the labor market.

3. Employment of manpower work programs to use skills and knowledge received, to accuate self-help, mainly in public works and the development of rural areas and to create job opportunities for young manpower.

4. Training of young citizens to be willing to accept social and political responsibility through investment of their time, skills, knowledge, and involvement.

Thus, education, training, and employment of unused human resources through Volunteer Service Organizations with expanded and improved programs will result in the expansion of the productive capacity of a national economy and increase of national income, if the needs of development are met.

Introduction

During the past decade governmental or government-supported Volunteer Service Organizations have been established in 57 countries all over the world. Presently, about 100,000 full time volunteers[3] are enrolled, of which about 80,000 are serving within their own country.

For about 100 years private volunteer organizations have been serving their communities and have been involved in many different kinds of social projects. Traditionally, volunteering means that an individual of his own free will gives his skills, knowledge, experience, time, and involvement to meet the needs of other human beings--very often without being adequately rewarded financially. The idea is not new.

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[3] Volunteers include young men and women, who are recruited, selected and trained for service in social and economic development; some of them are recruited and selected for volunteer service within a disciplined labor force (Kenya), or within a curriculum requirement for graduation at a university (Ethiopia), or within a compulsory military service scheme (like Iran's Education Corps). Therefore, the term "volunteer" is misleading in the traditional sense of a complete voluntary choice--the basic philosophy used is that every young man and woman should serve a need of its country development for a longer period of time.

What is new is that governments all over the world have become interested in adapting the original idea to the requirements of social and economic development in a faster changing society and have supported volunteer services of different types on a nationwide basis.

There are now two main categories of domestic-type Volunteer Programs (beside Export Volunteer Services which send educated youth abroad for technical assistance):

1. National Youth Service Programs (Service Civic) which provide basic education and skill training to uneducated or less educated youth serving as volunteers within their own country in projects emphasizing: modern agriculture, settlement, community development, public work construction, etc. Many African countries and some Latin American countries have programs of this kind. National Youth Services have, as of January 1967, about 50,000 volunteers working in these programs.

2. Domestic Volunteer Service Programs which mobilize young adults who already possess the knowledge and skills to carry out programs within their own countries. In Africa, Asia, and North and South America governments support long-term programs, with part-time or full-time participation, such as university student programs, agricultural development schemes or compulsory military development services, etc. As of January 1967 there were approximately 30,000 volunteers working in various domestic volunteer service programs.

Governments within their national planning can consider these Volunteer Service Organizations as flexible instruments to develop and shift unused human resources into the development process and to activate self-help.

The information on which the analysis is based was obtained from various sources. A questionnaire, worked out jointly by ISVS and OECD in Paris brought detailed information regarding programs in Kenya, Malawi, Jamaica, and Costa Rica, which have National Youth Service type programs, and Thailand, which has a Domestic Volunteer Service type program.

Additional information was obtained by correspondence and from discussions with government representatives, directors, and leading staff members of Volunteer Services and from ISVS information officers and regional officers representing Africa, Asia, and Latin America.

Education of Youth and Manpower Training

1. National Youth Services provide general education, physical education, and civic training to youth, mainly in the 10 to 20 age group. The programs include:

- literacy classes and basic education
- hygiene and health
- civics and citizenship, government policies and national institutions
- youth leadership techniques
- social activities, sports, and physical education.

National Youth Services also provide technical and vocational training in the theory and practice of improved methods in agriculture, nutrition, house or road construction, wood-working and carpentry, basic engineering, handicrafts, home economics, food conservation, etc.

Very often more than 50% of the volunteers have no schooling, or less than five years of attendance (dropouts). In those cases National Youth Services partially meet needs for general education and vocational training outside of the regular school system. In addition, in those countries where the population explosion has resulted in 50% and more of the population being under 15 years of age, it is therefore economically impossible for a country's school system to provide regular schooling for all youngsters. Here a Volunteer Service can provide the framework for general education of youth on a larger scale, since the cost per volunteer and year is lower than the cost per pupil and year in primary schools. (Some figures available to ISVS indicate that the cost for one primary pupil per year is equal to the cost for three volunteers per year in a National Youth Service Organization.)

These educational programs are functional and job oriented and closely interwoven with the technical and vocational training and the work program. The advantage of combining vocational training and general education is that neither is taught in isolation; volunteers use their new skills and knowledge immediately in work programs. This approach minimizes secondary illiteracy, which results when people have no chance or choice to use their new knowledge and, therefore, have no incentive to put forth their best efforts.

The time spent in general education and in technical and vocational training varies in different national programs. For Kenya's Youth Service and Malawi's Young Pioneers the program is equivalent to about a full school year.

Unlike the formal education system, Volunteer Service Organizations can be flexible and innovative in meeting special needs of the participants. They do not have to deal with many traditional interstructural and administrative problems faced by the regular school system.

As mentioned earlier, Volunteer Program costs per volunteer are also lower, because there is less investment in buildings and equipment, and the work program may provide some income (for example, through school farming or school workshops selling their products at the market).

But, of course, there are also limitations. National Volunteer Service Organizations are no substitutes for an adequate school system. Very often the education program lacks clear guidelines or curricula which are related not only to the work programs but also to the regular education and employment system. Also the combination of political, social, and economic goals results in conflicts and eliminates the setting of clear priorities.

However, because of their flexibility, job-orientation, and lower cost, educational programs in National Youth Services should be considered as an instrument on a nationwide scale to close the gap of employment-oriented education.

2. Domestic Volunteer Service Programs mobilize young adults who already possess a general education. Most are graduates of secondary schools or, in some cases, of universities. The main group of volunteers is between 18 and 30 years of age.

To eliminate differences in the educational background of volunteers and to prepare them for job placement in the work program, these services provide a job-oriented basic training which includes fields like:

- extension of general education
- civics, information about local governments
- human relations
- local customs and traditions
- basic psychology
- physical training

In addition volunteers receive training in:

- theory and practice of teaching
- theory and practice in improved methods of agriculture
- principles and practice of community development
- theory and practice of extension work, etc.

This type of training emphasizes the provision of resources for teaching and supervising, mainly in rural development within various work programs.

In addition, volunteers in both the National Youth Services and the Domestic Volunteer Services not only acquire skills and knowledge and become trained to use them in their daily work, they also derive experience as workers, group leaders, sometimes supervisors and teachers, and learn to be responsible for a project and its development. This social aspect--responsibility for a part of the work process in the community in which one lives--is an important aspect in manpower training before shifting to employment. Volunteer Service Organizations should realize this outstanding opportunity--which the regular school system seldom has--and therefore strengthen their efforts to delegate tasks to volunteers and help them to govern the organization partially by themselves. Such an approach also will provide experience as an active citizen.

Employment of Manpower

1. Volunteers of both types of services are also employed in work programs to carry out projects of importance to development of their own country.

National Youth Services concentrate on work programs in agricultural production, home economics, road and public work construction, housing, health service, land settlement, and workshops. They work on training farms and learn to use better methods in farming than are used at present in most villages. Others are given land by their villages, and they start co-operatively farming to raise different crops. Because of the lack of skilled manpower, larger groups of volunteers are employed in public works construction, house and road construction, carpentry, etc. Within a two year service program volunteers are employed about 250 to 430 days in those work programs; that means two years of service is about equivalent to one year of employment (and one year of education and training, see above).

Domestic Volunteer Service Organizations mainly focus on rural development. Their volunteers fill the gap of educated manpower in primary education, rural extension service and development work, health programs, etc. For example, Volunteers of Ethiopia's University Service teach for one year in village primary schools; this service is required as part of the university curriculum before graduation from the Haile Sellassie University. Iran's Education Corps teach for 18 months out of a two years' service in village primary schools; thus, since 1964 they have provided schooling in 22,200 villages throughout the country. Iran's Health Corps and the Rural Extension Corps fulfill similar tasks in their fields of assignment. Thailand's rural development volunteers teach and consult for two years in agricultural production and community development.

The service of these educated young adults has a double impact. They use their knowledge in educational programs to meet national social needs, thus making a contribution to the development of the human resources of their country. Equally important, as these social projects improve their country's over-all development, they will have improved job opportunities for the training, knowledge, and understanding acquired. Thus, they are helping to overcome the "white-collar-joblessness" that is plaguing so many emerging countries.

2. Both types of Volunteer Service Programs provide with their education-employment orientation a pool of trained manpower for the national economy. Skills, knowledge, and experience of young manpower are--after completion of service--available for sectors like agriculture, industry and handicraft, health and social services, and public construction. In order to be able to shift these resources into employment on a nationwide scale, volunteer services must consider planning manpower requirements from the beginning and should try to line up systems related to "job creating forces" in rural areas. In addition, volunteer organizations should consider similar systems related to the regular school system to provide further occupational education for former volunteers and insure that the training program of the Service is acknowledged as a portion of occupational education. This kind of structural relationship to regular education and employment on a nationwide scale is in the formative stage but, without doubt, is one of the essential roles for a Volunteer Service to provide an effective and continuous input into the development of human resources.

Some examples to provide this follow-up after completing service are already available:

Malawi Young Pioneers who have served for one year on farms in a rural youth leadership and agricultural training program are afterwards carefully selected for land settlement schemes, or at least have some further assistance through organized rural club work and agricultural extension programs. In Kenya the 333 first graduates from the National Youth Service are now employed by the government or by the private sector in the following fields: 98 in the Army, 60 in the Prison Department, 53 in the National Youth Service, 43 in the Police, 29 in Provincial Administration, 30 in the Air Force, 81 in Kenya Bus Service, 57 in construction companies, 31 by private security firms, and 90 in general employment as clerks, headmen, teachers, farm assistants, and shop assistants. Out of the Zambia Youth Service, 384 were either absorbed by educational institutions for further formal education or remained in camps awaiting job placement; 369 were placed in further skills training; 443 were employed in industry, commerce, mining, etc.; and 142 were placed in agricultural resettlement under the expert supervision of volunteers from other nations.

Also Domestic Volunteer Programs provide examples of constructive planning of a follow-up after completion of service:

Israel's Nahal members continue to 34%, after careful selection, as members of agricultural production cooperatives (Kibbuz). Iran's

Education Corps selects each year a large portion of its best volunteers who apply for employment as teachers. The initial five years are spent in primary schools in rural areas. This contract includes social security as a civil servant and the possibility of promotion and further teacher training through seminars and by correspondence. The best are selected for graduate programs--after completing the first five-year term of their contract teaching in villages--and have an opportunity to graduate from a university with a master's degree. Here volunteer service work programs and the follow-up are one unit of a combined system of teacher education and teacher employment. The Iranian government believes this will lead to a new approach to teaching and education and the volunteers are therefore called "Soldiers of Knowledge." As of this writing 8,700 members of the Education Corps teach in villages and 13,500 have been sent out as permanent teachers, thus providing regular primary schooling in 22,200 villages of Iran.

3. To complete the analysis of domestic-type Volunteer Programs and their role in human resources development consideration should be given to a National Service System where National Youth Service type efforts and Domestic Services cooperate side by side to provide an approach to further education and employment for educated and uneducated youth. In addition, those one or two years of social service in development of their own country hopefully can provide the environment needed to mature youngsters to citizens and professionals. Whether such a service should be an alternative to military service or should be part of an occupational curriculum (see Iran and Ethiopia) is an additional question which has to be considered in detail, since the special character of a country, it's history, military service system, education system, and --last but not least--its political structure are essential for such a decision. Within such a National Service System special consideration must be given to education and employment of girls and young women. The present domestic-type programs have not yet developed a specific effort to integrate these groups into their activities.

Besides these considerations, a nationally accepted service system would provide the framework to expand the numbers of volunteers enrolled, to structure the relationship to the regular system of education and employment, and would improve the impact on the development of young human resources in the total picture of a country.

A BRIEF MEMO ON MANPOWER FORECASTING

by

O. Ozoro[1]

It is often necessary in vocational and technical education planning to make fairly definite quantitative estimates of various technical skills for the purpose of establishing training programs. The problem is this: in the absence of any statistical data, how does one go about forecasting manpower requirements in various areas of technical skills?

Some investigators have taken the view that in this matter it is best to be guided by the experience of the industrially developed countries. On this basis, it is stated that experience in the developed countries has shown that for every professional engineer there are four to five technicians and for every technician there are ten to twenty craftsmen or skilled workers. Therefore, assuming that a certain number of engineers are needed (how does one determine this for a start?), it is a matter of simple proportion to estimate the numbers of technicians and craftsmen. By assuming a working population of, say, 25% of which about a third would be skilled or higher, a certain fraction of this would be engaged in the engineering pursuits. Thus, one obtains global figures for planning, although one is still in the dark as to the number of workers required in each area of skill (for instance number of electrical engineers, skilled electricians, plumbers, etc.).

In the experience of this writer, figures thus obtained have proved impossibly large and grossly unrealistic. In many cases, the developing countries have not got the resources to produce such numbers, even if they can be shown to be needed. More often than not, if such numbers were produced, it would have been impossible to absorb them in an incipient industrial economy for the simple reason that the resources are such as cannot generate a high rate of industrial growth to absorb very large numbers of skilled labor.

One obvious question in using this technique is whether it is valid to use the ratios of various levels of skilled labor obtaining in developed countries as a basis for similar estimations in developing countries where the conditions may be so vastly different. It may be that the ratio of technicians to craftsmen should be great in order to allow for greater supervision of craftsmen in skills that are not yet traditional and in which, consequently, self-pride and a sense of excellence are not yet well established to compensate for less supervision.

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[1] Chief Technical Education Officer, Ministry of Education, Ibadan, Nigeria. Formerly Delegate to Commonwealth Conference on the Education and Training of Technicians; Member, Comparative Technical Education Seminar Abroad, 1965.

Another line of attack on the problem of manpower forecasting is to determine manpower needs from planned investment. For instance it is estimated that in Nigeria it takes about £ 3,000 to create one new job (regardless of level of skill) in a reasonably mechanized factory in large industries. Thus, for a given planned capital investment (in the case of large industries), the number of jobs is obtained by the simple division: jobs = Capital/£ 3,000. Knowing the number of jobs and assuming that, on the average, about a third of the labor force has to be skilled or higher, then by simple proportion the number of engineers, technicians, and carftsmen can be estimated. This line of approach is more fully developed in Chapter 8 of the *Nigerian Report of the Comparative Technical Education Seminar Abroad*.

One obvious problem in this approach is that planned investment in the developing countries is not something definitive on which to place solid reliance. Industrial investment is quite often estimated on the basis of loans that are promised by foreign countries, anticipated private investment either from abroad or at home, anticipated earnings from exports of produce, or other resources, and so on. All these sources are notoriously unreliable. So that having estimated manpower needs on the basis of a certain planned investment which is subsequently totally vitiated or only very partially realized, one then has the problem of having spent scarce resources in producing a certain number of skills that, at least for the time being, cannot be used. This is perhaps a good thing because some economists maintain that it is good to have a certain amount of floating skilled labor readily available in a growing economy. On the other hand, if the number is large, it is questionable whether it is in fact wise to spend scarce resources to produce a large number of skilled labor that is, for the time being, unproductive, whose level of expectation has been heightened, and who may be frustrated by unemployment. One may be planting the seeds of a revolution!

II. CURRICULUM DEVELOPMENT IN OCCUPATIONAL EDUCATION AND TRAINING

A. Report of Workshop Discussion

Curriculum Issues in Occupational Education and Training

- Curriculum Design
- Curriculum Content Should Reflect a Community of Interests
- Continuous Feedback Required
- Certification and Testing
- Derivation of Instructional Content
- Curriculum Development in Nigeria
- Curriculum Development for Adult Training

Current U.S. Innovations in Curriculum Design

A Research Program of the U.S. Office of Education
by Dr. Sidney High

- Up-dating Ossified Curricula
- Curricula for Emerging Technologies
- Clustering or Common Core Training Techniques
- Teaching Methodology

The Richmond Plan for Pre-Occupational Secondary Education

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B. Related Workshop Papers

Skill Analysis Model by the Curriculum Working Group

Designing an Organic Curriculum by Robert M. Morgan and David S. Bushnell

II. CURRICULUM DEVELOPMENT IN OCCUPATIONAL EDUCATION AND TRAINING

A. Report of Workshop Discussion

Curriculum Issues in Occupational Education and Training

The usual problems of curriculum construction, it was generally agreed, are aggravated today by the rapidity of technological change, including the great mobility of students, teachers, and teaching materials which it has made possible. The natural tendency was noted for teachers to teach as and what they were taught "x" number of years ago, and for content to be added to curriculum, but seldom to be deleted.

Mr. Ozoro spoke of the City & Guilds of London Institute courses and examinations which are used in Nigeria as a basis for technical training. These courses require mastery of such things as wallpaper hanging and fireplace construction--skills never used in Nigerian building trades.

Lady Williams spoke of the objections she encountered in Jamaica when she suggested that a primer about Christmas snowstorms should be replaced by something more in line with a Jamaican child's everyday life. This was viewed as an attempt to fob off a second-rate education on these children.

Curriculum Design

The principal criteria for a good occupational education curriculum are two: it must prepare for a job, and it must be open-ended to allow the trainee to continue his education. Despite numerous difficulties involved, it was felt that the task of overriding importance for each country is to fashion its own educational materials from up-to-date information, extensively adapted to its unique background, present level of development, and projected future development.

Dr. High spoke in some detail of the steps involved in curriculum design--whether it be a two-month curriculum to produce a well-driller or a much longer curriculum in the formal education system designed to produce a broadly educated worker. First, the end product of the particular curriculum must be specified: the particular things a worker--when trained--must know, the skills he must have, the attitudes he needs.

In compiling this list of specifications, many persons should be consulted.

The next step is to decide what kinds of experiences the untrained learner must be put through to produce these specifications and what is the most efficient way to do whatever it is decided must be done. These are largely technical decisions for behavioral technologists: whether to use lectures, discussions, a field trip, films, tapes, or computer-based instruction; or should the learner actually manipulate some equipment?

The next step is to arrange for feedback on the results of the training. Here again outside consultation is extremely important. On-the-job observation can tell us how the end product (the newly-trained worker) is functioning. With this information the curriculum can be re-adjusted to produce a better end product--a better trained worker. This technique sounds very simple and seldom does one hear any arguments against it, Dr. High observed. However, it is all too infrequently employed.

The Curriculum Working Group agreed that to begin curriculum development it is necessary first to determine what the end product is to be. This requires the most expert current judgment as to what knowledge, skill, attitudes, and personality traits are needed to do the job well. (A Skill Analysis Model drawn up by the Group is found in the papers at the end of this section.) A logical source of this kind of information is the occupational analyst who should conduct a dialogue between curriculum designers on the one hand and users (employers) and anyone else who can give useful information of what the job involves, or may come to involve.

Mr. Levine felt, incidentally, that if occupational analysts were used in the manner and in the number they should be, not only occupational but also general educational curricula would change considerably.

Curriculum Content Should Reflect a Community of Interests

Too often, curriculum content is determined through purely judgmental procedures within the educational or training institution itself. Additional sources of information and expertise which should be actively involved in curriculum building are other educators, employers, employment agencies or training institutes, research groups, labor unions, and professional organizations.

Educators, of course, are key figures and the traditional fabricators of curricula. However, left alone with their own inclinations, they are tempted to "pack" the curriculum with academic subjects they feel will be beneficial. Even if they are both knowledgeable about and sympathetic to actual occupational requirements, it is unrealistic to expect them to know exactly what is needed in a particular occupation in light of rapid technical change.

Employers are well placed to know what training a job requires, and they constitute another key element. However, employers will often overstate the skill level necessary for a given job. If they are involved in actually developing the curriculum--and particularly if they are bearing some part of the cost--they are likely to be more realistic in their requirements. However, this principle of involvement has certain dangers, pointed out by Dr. Hanf. He noted that sometimes employers' methods of work are themselves obsolete, or their practices may be inimical to the objectives of a country's development plan. In these cases, a good curriculum must constitute a (sometimes radical) departure from standard practice, and its creation requires other types of personnel. In the case of a new technology or one new to the country concerned, of course, no employers will exist.

Employment agencies, with their practical experience on a somewhat broader scale than just a single firm's or a single industry's experience, can be valuable in establishing training requirements, Mr. Levine pointed out. A national training service--where it exists--has, of course, the express purpose of creating the skills required by an economy.

Research groups, whether they are in industry or in institutions of learning or elsewhere, should be involved so that curriculum is designed with future developments in mind and frequently up-dated. Dr. Skapski pointed out that even in developed countries there is usually no connection between the university and the planning of lower level technical education. The result is the complete absence of communication.

Labor unions, Dr. Skapski emphasized, should be involved in curriculum development, and in Nigeria this is being planned. In the U.K., under the Industrial Training Act of 1964, unions are heavily represented on the industry committees responsible for planning the training programs. So far, Lady Williams pointed out, the potentially thorny problem of union jurisdiction, or the lines of demarcation between different trades, has been smoothly handled.

Professional organizations, through their accreditation practices (which are critical in many fields from an employment standpoint), impinge directly on the question of curriculum content. Particularly in the field of health services, the cooperation of this element of the community must be gained if a modernized, rationalized curriculum is to be possible. Mr. Carvell described the situation in California where the RN (registered nurse) program requires a two-year course, while the LVN (practical nurse) requires an 18-month program. The RN organization will not accept training taken in the LVN program, so that a girl who may wish to switch from the latter program usually must start over again at the beginning. Dr. High stated that studies in the United States have shown that in the process of establishing a set of occupational training programs thirty separate accrediting organizations had to be contacted for recommendations and approval before it was possible for graduates of the various courses to qualify for jobs in their respective fields.

Continuous Feedback Required

Evaluation of curriculum content with a view to improvement and up-dating is of paramount importance in this period of rapid technological change. An essential aspect of curriculum development must be the provision for feedback which will answer such questions as: "How does the curriculum really function in practice? Does it turn out suitably qualified workers? What could be done to training methods, or to selection of candidates for training, to improve this performance?" Two major methods of assuring the continuous feedback of information were noted.

Advisory Committees can be constituted wherein members are drawn from industrial, agricultural, or service organizations--the user community--to help set entrance standards and develop curricula. Latin American experience has shown the importance of having committee members of a sufficiently high social standing to lend prestige to the committee's efforts if they are to be effective and of long duration.

Student follow-up studies are a second method. Training institutions should check on the placement success of graduates and also verify whether or not skills and knowledge taught during training are actually applied on the job. Lady Williams suggested that, when workers move into jobs from outside training, an arrangement can be made whereby the instructor goes along for a period to see how well prepared the workers are and whether an assimilable sequence of experience is being given.

Certification and Testing

Mr. Chan spoke of the obstacles to improvement in vocational curricula which stem from long traditions and of the need for universally accepted training programs and/or a method of assessing foreign qualifications. In Singapore shipyards, the major employers have old-line British supervisors whom the winds of change have not yet reached. They will accept neither students trained abroad outside the British system nor a shortened training program to produce, say, dockside marine engineers in four years. They still adhere to a 5-year apprenticeship system --a system started in the time of Elizabeth I. In the case of marine engineers the total requirement, including compulsory sea-service, is eight and one-half years, as they make no distinction between marine engineers working on ships at sea and those in the dockyard. The result is that many of the most desirable potential employees, best prepared academically, are lost because they will not submit to such an antiquated program.

The need was emphasized for each country to develop a curriculum testing and certification program adjusted to its own needs rather than to those of another country. One effect of this development would be to reduce a type of "brain drain" reported in Jamaica by Mr. Levine. There graduates of courses patterned on and using City & Guilds of London Institute certification tests frequently left Jamaica after passing the tests to seek employment in London.

Dr. Skapski emphasized the necessity of changing the examination syllabi when curricula are altered. He described the work of a special Technical Education Committee established in the West African Examination Council. It includes representatives of Nigerian industry and works closely with the City & Guilds of London Institute whose examinations have traditionally been utilized, attempting to substitute more suitable test items for such things as fireplace construction.

Dr. Skapski mentioned his interest in the use of a cumulative record of work to aid in assessing a student's abilities so that the examination results would not be the sole basis for judgment. Dr. Hanf cited the experience in the Congo where that system is being abolished because of its expense.

Dr. Hanf also spoke of the difficulty and expense of adapting curricula to local conditions, which has caused even such a body as UNESCO to stumble. He cited the dilemma encountered when attempting to choose between a poor, but relevant curriculum and a good, but irrelevant curriculum and its certification examination. All too often the former arrangement, though adapted to local conditions, may embody very low standards of performance. On the other hand, a good external curriculum--imported, say, from England or France into Africa, along with its demanding centralized examination--represents a widely accepted body of knowledge but may not be very pertinent to local conditions.

Derivation of Instructional Content

Both Dr. Frank and Mr. Levine independently put forth the idea that, in the face of rapid technological change and the impossibility of accurately forecasting manpower requirements, an attempt should be made to teach processes or functions in training institutions without identifying them with any given occupation. Inasmuch as a given process is useful in several dozen occupations, when the trainee went to work it would be necessary to supplement his training by only a very small amount of specific operational instruction.

Mr. del Campo, Lady Williams, and Dr. High all spoke of work in their various countries on identification of work elements and the development of training courses which embody a broad range of related skills common to a family of jobs. This is particularly important where detailed information on occupational requirements is lacking and in fields where technology is changing rapidly. Such courses are termed "cluster" in the U.S. and "common core" in the U.K. Lady Williams stressed that in the U.K. the first year of training under the engineering industry training board must be basic, common core training with a curriculum of integrated theory and practice suitable for all the cognate trades. It must be nonspecialist, and it must be off-the-job training. Then each particular skill that is required becomes a recognized module which is added on during the second year of training. This scheme is designed to have a flexibility which will allow training to keep up with rapid technological change, with only marginal retraining.

Mr. Araujo stated that this clustering technique has been used in electrical and mechanical trades in Brazil with good results.

Curriculum Development in Nigeria

Dr. Skapski reported the use in the Fourth and Fifth forms of the Aiyetoro Multipurpose Comprehensive School in Nigeria of an electronic trainer for radio servicing courses. This trainer reduces training time by as much as a half, and it is the intention to use the released time for further instruction in mathematics, physics, English, and economics with particular emphasis on how to operate a small servicing enterprise. It is felt that this added general education will make the future worker more easily retrainable when his present skill may have become obsolete. The new Center for Comparative Education Study and Adaptation (CESAC)[1] at the University of Lagos searches for such shortcut training techniques, adapts them to Nigerian conditions, and tests them in Aiyetoro and other schools for further feedback and improvement.

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[1] See Workshop paper at the end of Section V.

Dr. Skapski also discussed the general technical versatility training recommended by the Nigerian Seminar. It is given in the third year of secondary school and aims at providing a practical--but not specialized--experience in woodworking and carpentry, building and construction, metalwork, applied science including electricity, and technical drawing.

To counteract a very poor, authoritarian type of primary schooling, a special Introductory Unit has been inserted at Dr. Skapski's initiative in the General Science Course. It aims at developing the ability to make independent observations rather than repeating what the student believes to be the "right" answer, or the answer that will please his teacher.

* * *

Dr. Skapski: This method involves passing out for inspection specimens of some kind -- for example, twenty-nine perfect grasshoppers with all six legs and one defective specimen with only four legs. The teacher then asks students, one after another, to describe their specimens, leaving the student whose specimen is damaged until the very end. Only then, after twenty-nine boys have stated that their grasshoppers have six legs, does the teacher ask the last student, rather casually, "and how about your grasshopper? How many legs?" Almost invariably the student's answer is "Six, sir." "Ah!" the teacher then says, "Let's count them: One, two, three, four ... I see only four, why did you say six?" In some cases the child says, "I was afraid you would think I have damaged the grasshopper ..." "But this isn't the point," the teacher says, "We are learning to observe and report what we see. Why didn't you just report what you saw?" Of course, the observed objects vary from year to year and from class to class. It may be a leaf another time. But the approach remains the same, and let me add, that it works.

* * *

Curriculum Development for Adult Training

Mr. del Campo told of the work of INACAP in Chile on curriculum development. Among other things, answers are sought to questions such as, "What is it exactly that a carpenter needs to be trained to do? How frequently does he use each of his various tools?" and so on. Mr. del Campo stressed that their work has been with adult persons with family obligations, so it was possible to have them as trainees only for relatively short periods of time. One course is given during the day for people out of work or seeking work for the first time; it lasts about five months, eight hours per day. Another course is given in the evening for adults already working, to upgrade their skills and knowledge in their trades.

These courses must be sharply focused on the essential characteristics of the skill being taught. To determine the content of a lathe operator's job, for example, analysis of such jobs in a variety of firms --small, medium, and large--is undertaken. Once the whole picture is obtained, an analytic chart is made and a work program prepared. The pedagogical units of work start with elemental problems and progress to the more difficult ones, gearing technical, mathematical, and safety information to practical work. It is very difficult for these adults --out of school for some time--to understand the importance of theoretical concepts. If such concepts are given apart from practical work, they are rejected as a waste of time. However, once these students discover from the work that this information is essential, they will accept the theory and even ask for more. On the other hand, in the case of minors or young people, it is necessary to use a different training scheme because of the different purposes of the courses.

Dr. Skapski spoke of the Nigerian program for upgrading indigenous small entrepreneurs and their apprentices through the Vocational Improvement Centers and noted that the approach to teaching must be different from that used in the teaching of untrained young boys. An indigenous cabinetmaker has to be untaught several wrong working habits, and this is not easy. For instance, since the use of a vise is not known to him, he always holds the piece of wood he is sawing with his left hand, or he may sit on it. Even after he has received a vise and understands its use, he will continue to hold on with his left hand.

Hunger for general education, even among the almost illiterate, is so great that attendance rules at the Vocational Improvement Centers in Nigeria had to be reversed. Originally, attendance in general education classes for two evenings a week was required for admittance to workshops for skill improvement. Classes soon became overcrowded, while the workshop attendance was falling off. Now attendance at the workshop is required for admittance to the general education classes. At the lower of two levels this general education includes English, writing, reading, elementary arithmetic and bookkeeping, and small enterprise management. Also instruction is given in hygiene and the elements of civics: why there are taxes and what are the functions of government.

IBM has found in its operation of Job Corps Centers in the U.S., that youth education must be approached in a fashion different from the adult education with which it normally deals, according to Mr. Abronski. Mr. Levine raised the question whether he may not need an "unlearning" concept--something to displace a body of knowledge that is no longer useful. Mrs. Pedraza stated that this is the process called "reciprocal inhibition"; it is known and used by educational psychologists. Dr. High spoke of a U.S. Office of Education study aimed in this direction, entitled "Facilitation and Interference in the Older Adult Learner." It involves learning electronic beep signals to get at some of the principles of facilitation.

Lady Williams mentioned a research unit recently established at Cambridge University. Its special job is to find out what techniques are required for adult retraining: whether different techniques are needed, and how different, for training people of 25 from those needed for the 16-17 age group. What is needed when it is necessary to retrain a person of 40? Are there limits outside which retraining becomes impractical at any specific age?

Current U.S. Innovations in Curriculum Design

A Research Program of the U.S. Office of Education

by

Dr. Sidney High

The Workshop was privileged to have in its membership Dr. Sidney High, representing the Division of Adult and Vocational Research of the U.S. Office of Education, Department of Health, Education and Welfare. Dr. High undertook to outline in some detail the wide-ranging programs of his organization, made possible by a provision of the Vocational Education Act of 1963 in which Congress stipulated that 10% of the funds appropriated were to be used for research.

U.S. Government research into the derivation of curriculum content done under this program falls into two broad categories: the modernization of ossified training courses, and the construction of courses to cover emerging technologies.

Up-Dating Ossified Curricula

One of the first programs of the former type was an examination of the training practices in the field of aviation mechanics. This reappraisal was undertaken in 1965 at the request of the Federal Aviation Agency, which is responsible for certification procedure for mechanics involved in public air transport. Among other outmoded practices originating in the early days of aviation was the requirement that airplane mechanics must have a certain number of hours of instruction in woodworking and use of fabrics, materials that have not been used on most aircraft for many years.

Under a contract with the University of California at Los Angeles a survey was made of the actual work of 14,000 U.S. aviation mechanics employed by three types of organizations: the small general aviation company employing five or fewer mechanics, the large general aviation company, and the commercial airlines who employ their own mechanics. This information on current work practices was gathered in such a manner that it could be processed by computer, and it is being used now to produce a tested, validated curriculum and instructional materials. This should be ready in another year or two.

Curricula for Emerging Technologies

In the area of research designed to produce curricula covering emerging technologies, two programs are of interest: those for training the biomedical equipment technician and the industrial radiographer. The technician who operates a host of new medical inventions (artificial heart, lungs, etc.) must be trained not only in electronics and mechanics but also in chemistry and biology, because the machines are integrated into the human body. If this equipment is to be used widely, subprofessional technicians must replace the scientists and doctors who currently are operating it. Identification of the elements of a training program to produce such a technician has been completed, and in September 1967 the first class of biomedical equipment technicians is scheduled to begin training.

Industrial radiography is another rapidly growing field. This technique employs radioactive materials to produce a photographic film of some metallic object (such as a pipeline weld or metal casting) to reveal defects without having to destroy the item itself. Because there has hitherto been no training program available for personnel assigned to perform these operations, this occupation has had the highest accident rate in the country. A training program for industrial radiography was designed and tested with two groups of students at Texas Agricultural and Mechanical University. In the process, the course was reduced from 18 weeks to 16 weeks. Graduates have been snapped up eagerly by industry, and the validated training program is now available for use at other institutions.

At Oklahoma State University, a program has been launched to produce an electro-mechanical technician who can work with micro-miniaturized components in the computer and aerospace industries. These technicians are being trained to replace electricians and mechanics who formerly worked on large-sized components. It is impractical for more than one pair of hands to work on the tiny new mechanisms. A study of job requirements showed that, where normally it takes two years to produce an electrical technician and two years also to produce a mechanical technician, by taking the common elements of both curricula and integrating and compressing them it is possible to produce an electro-mechanical technician in a total of two years. This program is being put together now, and soon the first group of trainees will be put through, their work records studied, and the curriculum readjusted.

Clustering or Common Core Training Techniques

Perhaps the most extensive study of clustering has been carried out at the University of Illinois.[1] Six technical occupations were examined: those of electrical, mechanical, and chemical technicians and then the combinations such as electro-mechanical, etc. By very carefully determining what each of these technicians has to do and comparing all these tasks in a systematic fashion, a common core of activity was discovered. "Core" courses embodying these activities are taken the first year by all technicians; but in the second year each technician moves out into his own branch and takes the courses embodying activities peculiar to his own specialization. Should a technician change his mind about his career, or need to be retrained for some reason, he has only to back up one year.

The technique used to determine what each technician needs to know was described as follows by Dr. High. A set of cards was prepared with a certain bit of course content typed on each card. This was done by going through catalogs of technical institutions, by looking through textbooks, and by asking people who were knowledgeable about technical training. The end result was a total of 99 numbered cards bearing succinct statements of possible course content, such as:

> "1. Technical and scientific oral and written communication including business forms, reports, emphasizing the different kinds of business letters. Techniques of collecting and presenting scientific data. Informal reports and formal reports. Special types of technical papers."
>
> "32. Elementary techniques and practices of maniuplation and fabrication of simple laboratory apparatus of heat resistant glass. Bending, cutting, grinding, pulling, and joining glass."

Then the investigators asked a selected group of experts, supervisors, and practical operators in each field to sort the cards into three piles: (1) the things the technician in this field absolutely must know to function well; (2) the things that perhaps would be less essential but might be useful to know; and (3) things that really are irrelevant to the occupation.

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[1] Schill, Wm. J., and J. P. Arnold. Curricula Content for Six Technologies. Bureau of Educational Research and the Department of Vocational and Technical Education, College of Education, University of Illinois, Urbana, 1965. The study was supported in part by the Cooperative Research Program of the Office of Education, U.S. Department of Health, Education, and Welfare. 118 pp.

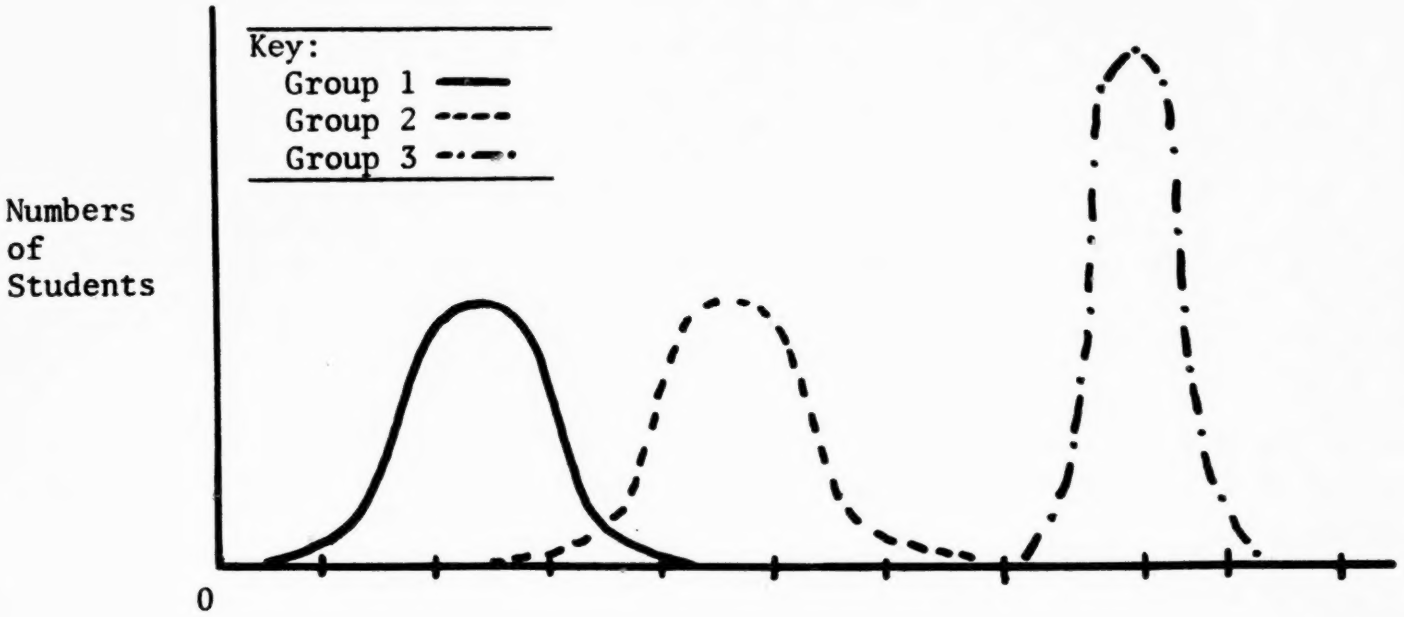
Card number 1, of course, came into pile number one for each occupational group and was incorporated into the common core, because everyone needed to have this kind of training. Card number 32 on the other hand was needed only by persons in the chemical field.

One thing this study was designed to reveal was whether there is a difference between what the man on the job thinks he does, what his immediate technical supervisor thinks he does, and what the manager (the third echelon up) thinks he does. It was thought there would be significant differences in the way men at these three levels sorted the cards. However, surprisingly, this study showed no great differences; the sort was fairly consistent at all three levels.

At this point it is interesting to note a contrary situation existing in the airline industry, called to the Workshop's attention by Mr. Podesta. He reported on a study for United Airlines done by Stanford Research Institute. It included an assessment of the role, or image, of the airline hostess as seen by the hostess herself, her supervisor, the airline recruiter, and the passenger. In this case the four images varied greatly.

Teaching Methodology

Another field in which much research had been done is that of instructional methodology. Dr. High felt that this is an area where a real breakthrough is about to occur. This will have an important effect on the economics of education as well as other aspects of education.



The three curves in the diagram above represent the results of a study[2] recently made in a corporation that wanted to upgrade some of its existing personnel. These people were divided into three groups. Group No. 1 (represented by the bell-shaped curve on the left) were simply tested as to their knowledge of a given subject. Group No. 2 was given instruction in this subject by the best of conventional means: a very good instructor using a blackboard, some textbook material, etc. Then the group was tested with the results recorded in the middle curve. The mean had moved considerably to the right. The whole group had moved over and knew more about this subject than they had known previously; however, the spread between the best student in the class and the poorest was about the same as in Group 1.

Group No. 3 was given a very carefully prepared multi-media program of instruction that cost several thousand dollars per hour to develop. Use was made of all kinds of tapes, films, and everything available to modern teaching technology. When this group was tested, the results were those depicted in the right-hand curve: mean scores about twice as high as for Group 2 and a much reduced spread between the extremes of the class. The lowest man in the class knew almost as much as the highest man, and the poorest student in Group 3 ranked higher than the best student in Group 2. In other words, Group 3 had learned about twice as much as Group 2, and the amount of time spent on instruction was less for Group 3 than for Group 2. The dollars and cents significance of this type of training program has caused a great deal of excitement about the new teaching technology. Although the initial development cost of this training program was high, its cost per student would be negligible if it were widely used. And, or course, the savings involved in being able to teach students twice as much in a smaller amount of time are really substantial.

Other aids in teaching methodology are being developed. One is a computer-based simulator used to train auto mechanics to analyze mechanical difficulties. Using this machine, the teacher creates a malfunction by pushing a button, instead of having to disable an actual engine. The student has the simulated automotive system in front of him. By pressing the correct combination of buttons, he can analyze the symptoms, diagnose the trouble, and make the system operative. He can go through the mental process required to correct 25 or 30 malfunctions in the time it would take him to work through one or two on a real engine. Of course, at an appropriate time in the course he must use real equipment to learn manipulative skills such as removing the engine head or adjusting the carburetor with a screwdriver.

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[2] Study conducted under the supervision of Leslie Briggs, American Institute for Research, Palo Alto, California.

Another research activity reported by Dr. High examines whether it is possible to put together a "teacher-proof" curriculum: one that will give good results even in the hands of weak teachers. Other research and development work is proceeding on the preparation of one-semester courses in economics, leadership, and physics, which represent three different types of teaching content. The courses are being structured to enable the learners to achieve specific, predetermined performance objectives. A wide variety of media are being employed in the courses, and the most efficient media mix for the attainment of each objective is being determined experimentally. The results of this effort will be watched with interest.

The "Richmond Plan" for
Pre-Occupational Secondary Education

This session of the Workshop was opened with a film on the "Richmond Plan" made by KRON, a San Francisco television station. It dealt with the operation of a pre-technical program of education at the high school level developed some years ago in De Anza High School in Richmond, California. Today ten to twenty high schools in the San Francisco Bay Area are using the principles pioneered at Richmond.

Following the screening of this film, Mr. Winston Richards, principal of one of the high schools which operates such a plan (Pacific High School in San Leandro), spoke of several recent programs designed to interrelate general and pre-occupational education in an effort to interest underachieving youngsters. These children were potential high school dropouts, because existing courses in the so-called "comprehensive" high school had no real appeal for them. Mr. Richard's school is located in a very homogenous, lower middle-class neighborhood of skilled and semi-skilled workers with very few representatives of the professions.

The first program Mr. Richards described was the Pre-tech Program which relates English language usage, mathematics, physics, and shop work in the process of solving and reporting on practical problems. The problem covered in the film was the construction of a set of accurate weights. It showed the students listening to an explanation of the principles of Hooke's Law, then working through the mathematical formula to determine how to divide up a brass rod used in the manufacture of the weights, then manufacturing the weights. Subsequently a report was written on this activity.

This course was designed for the capable average student with a slightly higher than average IQ and a good understanding of mathematics, but for whom an academically-oriented program had no real appeal. In the State of California as a whole, the dropout rate in the first year of junior college is 40%; as of June 1967, 53% of the Pre-tech graduates were completing a two-year junior college program which would allow them to get jobs in industry or to continue their college education at a four-year school.

The Richmond Plan requires very close coordination of curriculum construction and the teaching methods of the team of teachers involved. Although The Ford Foundation provided small amounts of money to pay teachers for the time required to work out the initial curriculum, no extra funds have been available for time consumed in ironing out day-to-day problems of application. Launching this program requires strong community support and deep and continuing administrative interest and support if the teachers are not to become discouraged and revert to old, familiar teaching patterns. And, of course, it requires dedicated teachers who want to participate in such a program.

A second program of innovation is much easier to start than the initial program. At Pacific High School, FEAST (Food Education and Service Technology) was the second curriculum innovation. This program was aimed at students a cut or two below the Pre-tech students--students who normally would never have darkened the door of an institution of higher learning. The program is open-ended and highly goal-oriented. Upon graduation from high school FEAST students can go directly to jobs in the food service industry or--if they have the interest and ability --to Junior College. From this point they can enter into the food industry at a higher level, or go on to a four-year college that offers a program in hotel-restaurant management. Although no FEAST student has yet reached the four-year college level, a reasonable percentage have not only gone on to junior college but have sought out and found scholarships to do so.

At present--at the behest of the teachers involved--consideration is being given to a complete revision of the industrial arts program, which the teachers themselves have decided is probably the furthest out of step with the times and the needs of youngsters in society. Their aim is to find a way to give these youngsters the tools and the attitudes with which they can go into industry and be teachable--or, as the telephone company puts it, "tolerate instruction."

Mr. Richards spoke of the impossibility of disseminating to others the curriculum used for Pre-tech or FEAST. The only way to get such an interdisciplinary curriculum is for the teachers involved to sit down and work it out together according to their perceptions of the needs of the youngsters, their own teaching capabilities, and the facilities at their disposal.

Perhaps the best measure of the impact of this plan on many of the students is found in the words of a recent graduate who turned up at a Pre-tech Christmas party: "Stop, I want to tell you something. I'm over at Treasure Island--in a Navy electronics school. Now when I was a Pre-tech I had pretty good grades, but I figured a lot of it was garbage too. And I want you to know it isn't garbage. It's all solid usable stuff. I'm using it. So wake up."

Dr. Harry Kincaid, of Stanford Research Institute, who is directing evaluation studies in the schools using the Richmond Plan, summed up his conclusions for the Workshop. On the basis of the evidence so far analyzed, it can be concluded that the Richmond program is working in a number of respects. Students, their parents, and their teachers testify to this. The Richmond Plan students show up better on a number of counts than control group students. In addition, a wide variety of findings all seem to point in the same general direction concerning the efficacy of the Richmond Plan program. Also, the Richmond programs have other desirable effects within a school, namely, on both Richmond and non-Richmond teachers and on the development of other experimental programs within a school.

Dr. Kincaid went on to point out that there is extremely wide variation among schools that are using the Richmond Plan. The quality of the various programs and their effectiveness for the students vary enormously along a number of dimensions. Analysis of these dimensions will be dealt with in the final written report of Stanford Research Institute to the U.S. Office of Education, which is supporting the study. He also emphasized that the Richmond programs can have notable negative features, particularly in schools where the program is poorly operated and managed.

Also emerging from the study are a number of guidelines concerning the administration and operating of Richmond programs as distinct from measurements of how well the program is working for the students:

1. Enthusiasm of the teaching team is extremely important.

2. In-service training of teachers is imperative.

3. Teachers must have time to meet and communicate with one another concerning the Richmond-type programs.

4. In the best programs, the teachers are all volunteers.

5. Teachers must be flexible with respect to their disciplinary commitments and respect the disciplines of other teachers.

Dr. Kincaid stated the following general conclusions that he thought would be warranted at this stage of his data analysis:

1. The Richmond Plan has a potential for significant desirable changes in secondary education. It appears to be breaking down traditional barriers to learning by providing the framework in which students see the relevance of learning to life.

2. The concept is diffusing rather rapidly in a number of forms.

3. There are a great number of formidable forces arrayed against Richmond-type programs. Foremost among these are cost, status (the second-rate image given vocational education), and tradition.

4. Whether or not the Richmond Pre-tech Plan survives the forces arrayed against it, there are two promising avenues of action:

    a. Development of alternatives or adaptations of the Richmond Plan that are less costly, have more prestige, and are less revolutionary in method, but which will achieve some of its desirable benefits.

    b. Training the coming crop of teachers in interdisciplinary methods.

B. Related Workshop Papers

SKILL ANALYSIS MODEL

by

The Curriculum Working Group

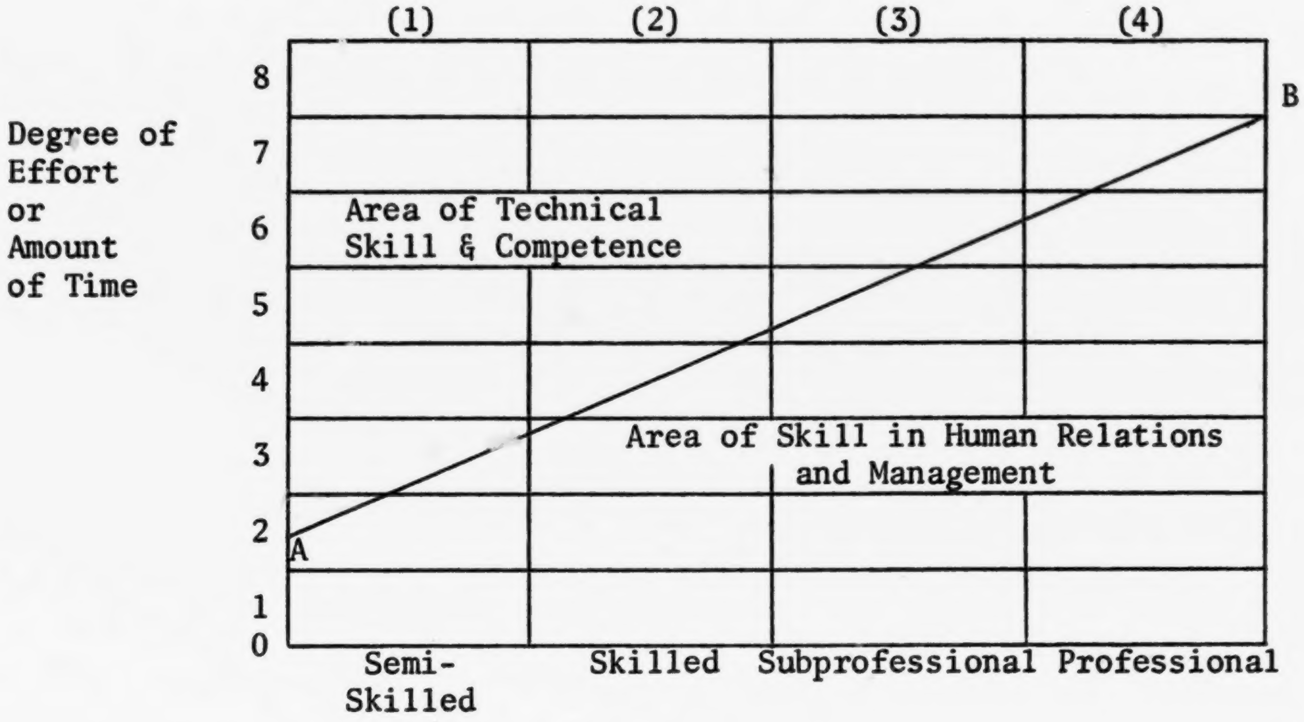
In order for the Curriculum Working Group to discuss the types of skills, knowledge, and personal attributes required in different occupational fields, a simplified classification of job levels and lines of activity was adopted. It was recognized that the skill requirements, as well as general educational requirements, of each technical level vary both in degree and quality; however, some point of reference was needed in order to concentrate attention on the problem of designing curriculum content, syllabi, and methods of instruction. It was further recognized that even the same level of competence in different occupational fields might require unique curriculum content and different methods of instruction. Thus, for example, the content and method of instruction necessary to train a skilled factory machinist might be entirely different from the methods and the content of training for a skilled agricultural worker, or for a health service technician. With these limitations in mind, the following broad classifications were used as a frame of reference in group discussions:

> Professional Level: This is the highest level of skill and includes the traditional professions; i.e., doctor, lawyer, top management positions, high level technicians, and other positions requiring considerable education and training beyond the secondary level.
>
> Subprofessional Level: This includes a vast array of technicians in various fields of activity, middle management positions, and other occupations requiring specialized training, education, or experience.
>
> Skilled Level: This includes skilled craftsmen, factory workers, agricultural workers, and workers in service, clerical, and distributive occupations.
>
> Semi-Skilled Level: This includes workers at the operative level in any occupational field where management responsability is at a minimum in the day-to-day activity of the worker.

It was believed that unskilled workers should not be included in the group discussion, nor was the skilled artisan (goldsmith, silversmith, etc.) included in this classification, unless he works in a modern productive system. Traditionally, skilled artisans work outside the realm of modern production methods, and occupational training is conducted on an individual basis, such as from father to son. The Working Group recognized the importance of this sector of labor to the economy of some nations; however, the consensus was that training in such activities was not usually suited to a training scheme designed to produce skilled workers involving modern industrial systems and mechanization.

With the foregoing classifications as a frame of reference, and as time available did not permit a detailed examination of the differences in the skill requirements and personal traits of the workers to be trained at each level, a model was adopted to illustrate the difference combinations of skills required at the various working levels.

Illustrative Model of Combination of Skill
Requirements at Various Working Levels


(1)
(2)
(3)
(4)
Degree of Effort or Amount of Time
8
7
6
5
4
3
2
1
0
B
A
Area of Technical Skill & Competence
Area of Skill in Human Relations and Management
Semi-Skilled
Skilled
Subprofessional
Professional

Explanation of Illustrative Model

The ordinate (left hand margin) of the diagram is scaled from zero at the base to eight at the top. This scale represents time. (It could also represent effort, if effort were as easy to measure.) The abscissa or base of the diagram is divided into four skill categories, ranging from the least skilled on the left to the highest skilled at the right.

The dark line bisecting the total area included in the diagram represents the division between technical skills and skills in human relations and management. Thus, as shown on the illustrative model, a worker at the semi-skilled level spends most of his working day (about six hours) using his technical skills (manipulative and/or cognitive). When the amount of time spent by a semi-skilled worker on technical activity is compared with that spent by workers at higher skill levels, one can see that the time spent on technical activities diminishes by comparison. The time spent by the professional workers is devoted mostly to the use of human relations and management skills.

The fact that workers at high skill levels may not spend most of their time actually using manipulative or cognitive technical skills does not mean they do not need them. It may be essential that they have extensive knowledge and ability in technical skill areas in order to instruct, evaluate, or improve the work of others. The implication of the model is that workers at higher levels of skill must not only possess technical skills but, in addition, must have skill in other areas, such as human relations and management functions.

Limitations

1. The model is an adaptation of one commonly accepted in management and supervisory training courses, is only illustrative, and is not based on actual data obtained from known research.

2. The degree of the angle bisecting the plane is arbitrary and simply illustrative of the different degree to which the workers in each skill classification might be expected to spend their time and/or effort while on the job.

3. The actual amount of time or effort spent would vary widely depending on the occupational field; therefore, the model may not be appropriate, as drawn, for many technical occupations. It is most likely to be representative of the time distribution between activities requiring technical skill and knowledge as opposed to those requiring human contacts or decision-making skills.

Discussion

Technical Skill and Competence: It is an obvious fact that there exists a wide array of cognitive and manipulative skills which require vast ranges of mental ability, education, psychomotor skills, and physical strength. For example, workers at the semi-skilled level in a warehouse might do little more than lift crates and operate a single hand truck or mechanized fork lift. The emphasis here is primarily physical. But a semi-skilled draftsman might need to know how to use drawing implements (psychomotor manipulation) and depict measurements and calibrations on a blueprint (cognitive process).

Human Relations and Skills: This broadly applies to a person's ability to plan, organize, direct, evaluate, and coordinate activities being conducted under his area of responsibility and authority. It includes conceptual skills that lie beyond mere recognition. Ability to think in terms of the abstract, as well as the concrete, is one of the principal differences between the skill requirements of persons at professional, subprofessional, and technical levels and those persons employed at lower-level skilled jobs.

As one looks at the way the line divides the technical skills area and the area of human relations and management, it will be noted that even the semi-skilled worker requires some human relations and management skills. This seems to be a realistic assumption regarding factory workers for two reasons. First, since modern manufacturing processes have placed large numbers of people under one roof, it is necessary that workers possess the ability to work together. Second, it seems reasonable that in addition to developing the worker's ability to work productively and cooperatively in a group, training should also prepare him to advance to a higher skill level, if he has the capability and if the opportunity is realistically available.

DESIGNING AN ORGANIC CURRICULUM

by

Robert M. Morgan and David S. Bushnell[1]

In the early 50's American education experienced its first widespread public scrutiny. In reaction to the dramatic scientific achievements of the Soviet Union at that time, the American people wanted to know, "Why are we behind?" In our frustration and bewilderment at having been bested by our cold war antagonists, we turned critically to the principal shapers of our engineers, scientists, and mathematicians in our schools. This attention resulted in significant changes in the educational system. In the decade following "Sputnik," whole subject matter areas were revised. We now have new math, modern physics, and new reading programs. Programmed instruction, computer-assisted teaching, and instructional television are passing from the experimental to the operational phase. Among the more important consequences of this focused attention is the realization by the public that the schools can change.

For years the United States has led the world in its commitment to the goal of equal educational opportunity for all citizens. Universal education for virtually all American children between the ages of 6 and 13 has been achieved. At the high school level, the United States leads all other nations in the percentage of 17-year olds enrolled in full-time schooling. A recent UNESCO survey reported the United States with 81 percent, England with 56 percent, Belgium with 30 percent, and Germany with 13 percent of this age group enrolled in full-time education. Almost 70 percent of the youngsters in the United States who start in school at age 6 actually graduate with high school diplomas.

Our leadership at the college level is indicated by the fact that only 4 percent of college-age youth in the European Common Market nations receive university degrees in contrast to 20 percent of their American counterparts. These seem to be heartening figures, especially when viewed in light of today's employment statistics.

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David S. Bushnell is Director of the Division of Adult and Vocational Research, Bureau of Research, U.S. Office of Education.

It is true that we are educating more of our young people than any other nation--but is that sufficient? Last year's class of college graduates represented only about 20 percent of those who first began school. Nineteen percent of this group left school before the eleventh grade; 30 percent didn't finish high school. Thirty-five percent entered college but only 20 percent graduated with a Bachelor's degree. Thus, 8 out of 10 of these students were candidates for jobs requiring less than a college degree.

Yet only one of these 8 received any kind of occupational training in the public schools! The remaining 70 percent have historically had a limited number of options open to them. They can take entry-level jobs that have little skill requirements; but these jobs are becoming fewer. They can be employed and trained by private industry in on-the-job or vestibule training programs; however, rapid economic expansion and changes in technology have made it more difficult and expensive for industry to provide this kind of training. A relatively small number can engage in apprentice training, but, again, there are a limited number of such programs available. Some will enter post high school vocational or technical training in community colleges or private institutes.

It seems clear that more Federal funds are needed to assist the established public educational institutions to develop and make available relevant educational and training programs which are responsive to the present economy.

A soaring technology and a healthy modern economy largely depend upon our ability to adapt to changes in productive capacity. Not only are engineers needed to design and install new and improved equipment, but more trained technologists are required to plan and manage production, to maintain automated apparatus, to sell and service the product, and to conduct research for newer and better products. A growing modern economy also requires more and more teachers, scientists, and professional managers, advertising and sales people, computer programmers and technicians, and mechanics and maintenance workers of all kinds.

Young job seekers, faced with a continuing shift from production-oriented occupations to service occupations, require a broad base of cognitive, communicative, and social skills. Many of the former types of entry-level occupations are now unavailable to youngsters entering the labor market. Further, while qualifying for an entry-level occupation is a necessity, a person's first job can no longer be viewed as a final career commitment but should be looked upon as the first in a series of job changes leading, hopefully, to a stable and satisfying career.

Unfortunately, much of what is now taught in our public schools fails to recognize that technology is generating profound changes in the nature of work. The tendency in the past to separate general and vocational education has penalized both those who are college-bound and those who plan to terminate their formal education at the end of high school or junior college. The academically oriented students are directed to college preparatory programs which will enhance their chances for college admission. They have little opportunity to acquire a knowledge of the occupational world in which they will live and earn a living as adults. At the same time, vocational students receive too little opportunity to develop competence in the basic educational skills which they must have if they are to cope adequately with present day society.

Those who plan to go on to college are not prepared to cope with the question, "What happens if I leave college before graduation?" On the other hand, those exposed to current vocational programs frequently find themselves being trained for a narrow range of job skills. Even if such students should qualify for their first job, they are still faced with the need to adapt to a changing labor market. A third and large segment of our public school population is not enrolled in either vocational preparatory or college oriented programs. These "general" students often receive a diluted program which in too many cases provides little academic or occupational preparation that is useful to them in the adult world.

From the perspective of providing for the optimum development of all students, the present allocation of resources and the types of curriculum available in the secondary schools are inadequate.

Purpose

The problems and shortcomings associated with our present-day program of education indicates a need for a major redefinition of goals and an overhaul of the educational process. Fortunately, the technology which created many of these problems offers some hope for their solution. The computer, for example, can serve as an intermediary between employers and school counselors, making possible far better information systems for funneling industry's job needs to curriculum planners in the schools. Flexible scheduling through computers can make possible the development of learning experiences to meet the particular needs of individual students; and indications are that computer-mediated instructional techniques can succeed in permitting the student to involve himself at his own rate in the learning process. Even computer games have been successfully employed as a method of teaching teenagers to think through appropriate career choices.

The use of instructional television, single concept films, videotapes, teaching machines, and simulators should be commonplace resources in the classroom by 1975. Textbooks will appear which will gear the information to the background and reading level of the student. Experiments with tutorial programs employing older students and subprofessionals offer hope for giving more intensive attention to those children requiring it, while at the same time helping to offset the spiraling cost of education. Each of these examples illustrates that we are in the take-off stage and can, with appropriate planning and funding, achieve the outer reaches of educational excellence.

Under the stimulation of Federal legislation, new opportunities for research on major curriculum redesign are now possible. These opportunities are occurring at a time when teachers, curriculum planners, and school administrators are under pressure to provide today's youngsters with the kind of education which is relevant to living in today's world. It would be a mistake, however, to let employers with their frequently narrow entry-level skill requirements or even parents with their sometimes unrealistic career expectations dictate the type of education which should be available in our schools. The educator and the employer must work together to determine the appropriate knowledge, skills, and attitudes which will qualify today's students for their life roles as employed adults and citizens.

Unless we radically modify our present system, we will not succeed in designing an educational program which will be responsive to the present day needs of students. The desired program should permit the maximum self-actualization of each individual. If a youngster leaves school before graduation, he should leave with functional skills. The student who graduates from the program should possess the necessary qualifications for maximum flexibility in his post high school activities. He might enter a community college or a technical school and receive post high school occupational training. He should also have entry-level occupational skills which permit him to go to work. He should have the additional option of continuing his education in an adult education program, if he chooses. The key point is that he should be able to decide which option to choose after high school graduation, not three or four years before!

An Organic Curriculum

The first step in building such a student-centered curriculum is to study those behavioral attainments needed by the individual for entry into a variety of post high school activities. Whenever possible, these requirements should be stated specifically and in measurable behavioral terms. Following the lead of the systems analyst, we should describe specifically and precisely as possible the learning experience which would lead to the desired behavioral outcomes.

The ingredients of a high school program which will assure the attainment of these specifications will certainly include academic as well as occupational training but should also include such components as personal development, real work experience, and personal and vocational counseling (see Figure 1). Even the avocational or school-sponsored recreation or social programs may be considered an integral component in this system. Each of these components and subparts must be defined in terms of its contribution to the attainment of the specified behavioral goals.

A massive research effort is required to develop and validate this system. Such an effort is presently feasible and can produce significant improvements in the learning process. An "organic" curriculum, as envisioned, would necessarily have to be interesting, challenging, and motivating to each student. It would probably utilize appropriate self-paced and self-instructional technology and maximally accommodate individual differences in learning rate. It should be designed so each student will succeed and yet it should be rigorous in level and content. Furthermore, after thorough experimentation and revision, the integral curriculum should be capable of implementation in or adaptable to many different comprehensive school systems in the Nation; and it should be cost effective in the implementation stages.

In general, the over-all design of this curriculum should:

(1) Integrate academic and vocational learning by appropriately employing vocational preparation as one of the principal vehicles for the inculcation of basic learning skills. In this way learning could be made more palatable to many students who otherwise have difficulty seeing the value of a general education.

(2) Expose the student to an understanding of the "real world" through a series of experiences which capitalize on the desire of youth to investigate for himself.

(3) Train the student in a core of generalizable skills related to a cluster of occupations rather than just those related to one specialized occupation.

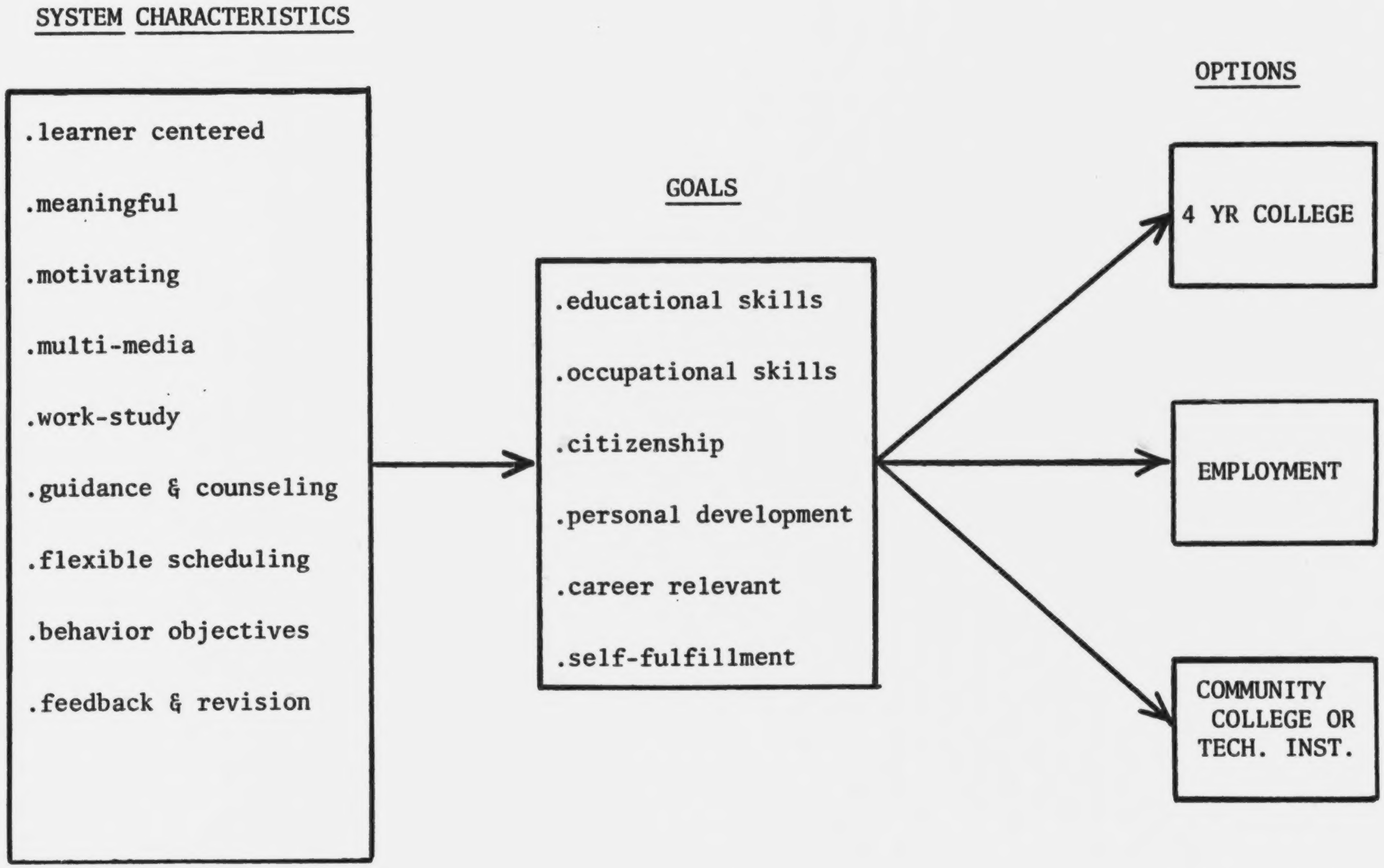
(4) Orient students to the attitudes and habits which go with successful job performance and successful living.

(5) Provide a background for the prospective worker by helping him to understand how he fits within the economic and civic institutions of our country.

(6) Make students aware that learning is life-oriented and need not, indeed must not, stop with his exit from formal education.

AN ORGANIC CURRICULUM

Figure 1


SYSTEM CHARACTERISTICS
.learner centered
.meaningful
.motivating
.multi-media
.work-study
.guidance & counseling
.flexible scheduling
.behavior objectives
.feedback & revision
GOALS
.educational skills
.occupational skills
.citizenship
.personal development
.career relevant
.self-fulfillment
OPTIONS
4 YR COLLEGE
EMPLOYMENT
COMMUNITY COLLEGE OR TECH. INST.

(7) Help students cope with a changing world of work through developing career strategies which can lead to an adequate level of income and responsibility.

(8) Create within the student a sense of self-reliance and awareness which leads him to seek out appropriate careers with realistic aspiration levels.

There are many unanswered questions that must be researched before such a curriculum can become operational. The problems of logistics alone are large and complex. How do you control the flow of students through the program without inhibiting individualized learning? Without the traditional "Carnegie units," how can school accreditation be achieved? As the roles of teachers change, will the emerging roles be acceptable? Would this system work better in a 48-week time cycle than in a 36-week cycle? How can the guidance activity contribute more effectively toward accomplishing the system objectives? How can present instructional media be most effectively used and what will be the nature of required new media? What are the problems involved in cataloging and programming the specific behavioral objectives of an entire curriculum, especially one as ambitious as this?

These and many other fundamental questions must be answered before we reach the "Kittyhawk" phase of what could become a moonshot for education.

Current Programs

While most of the research and development efforts in curriculum have been small and fragmented to date--directed to the improvement of a particular subject matter area--more recent pilot efforts to redesign an entire curriculum are in evidence. A number have been focused on the problem of keeping young people in the system long enough for them to benefit from the experience. The most important feature that characterizes these efforts is the integration of two educational areas that have been traditionally quite separate--the academic and the vocational.

In Richmond, California, for example, a major effort was made to integrate the vocational and general educational curricula. This was done by redesigning the content of traditionally-taught subjects so that they related as much as possible to job training programs. Math was taught by means of job-related examples and problems. Communication skills were related to performance requirements on-the-job. What were at one time judged to be potential dropouts in the tenth grade became, by their senior year in high school, candidates for technical training at nearby junior colleges.

Another effort in relating the verbal-skill-oriented high school's general education program to the interests of many students was carried out by an M.I.T. curriculum study group. Working with a group of dropouts, they successfully managed to capture and hold the interest of youngsters who rejected the normal pattern of schooling. It was necessary to develop a free interchange among the different academic subject matters, bringing together various pieces of learning into a cohesive whole, in which these areas are not fragmented but have an over-all direction and purpose. By following this course of action, the possibility of early failure was minimized as youngsters moved from the relatively unstructured atmosphere of the elementary school into the more structured curriculum of the secondary school.

Job Corps centers have provided an excellent opportunity for designing learner-centered programs independent of many of the traditional constraints. In trying to define what the end product of such a program should be, the Job Corps educational planners determined that the economically self-sufficient, socially adaptive citizen needs many of the things offered by the traditional school system and much that is not. He not only needs basic educational skills but he needs to know about the workings of our society and his role in it; he needs to develop a realistic and favorable self-concept; he needs several career strategies to be able to operate effectively in our free enterprise system; and he needs the personal development that will permit him to make socially adaptive responses.

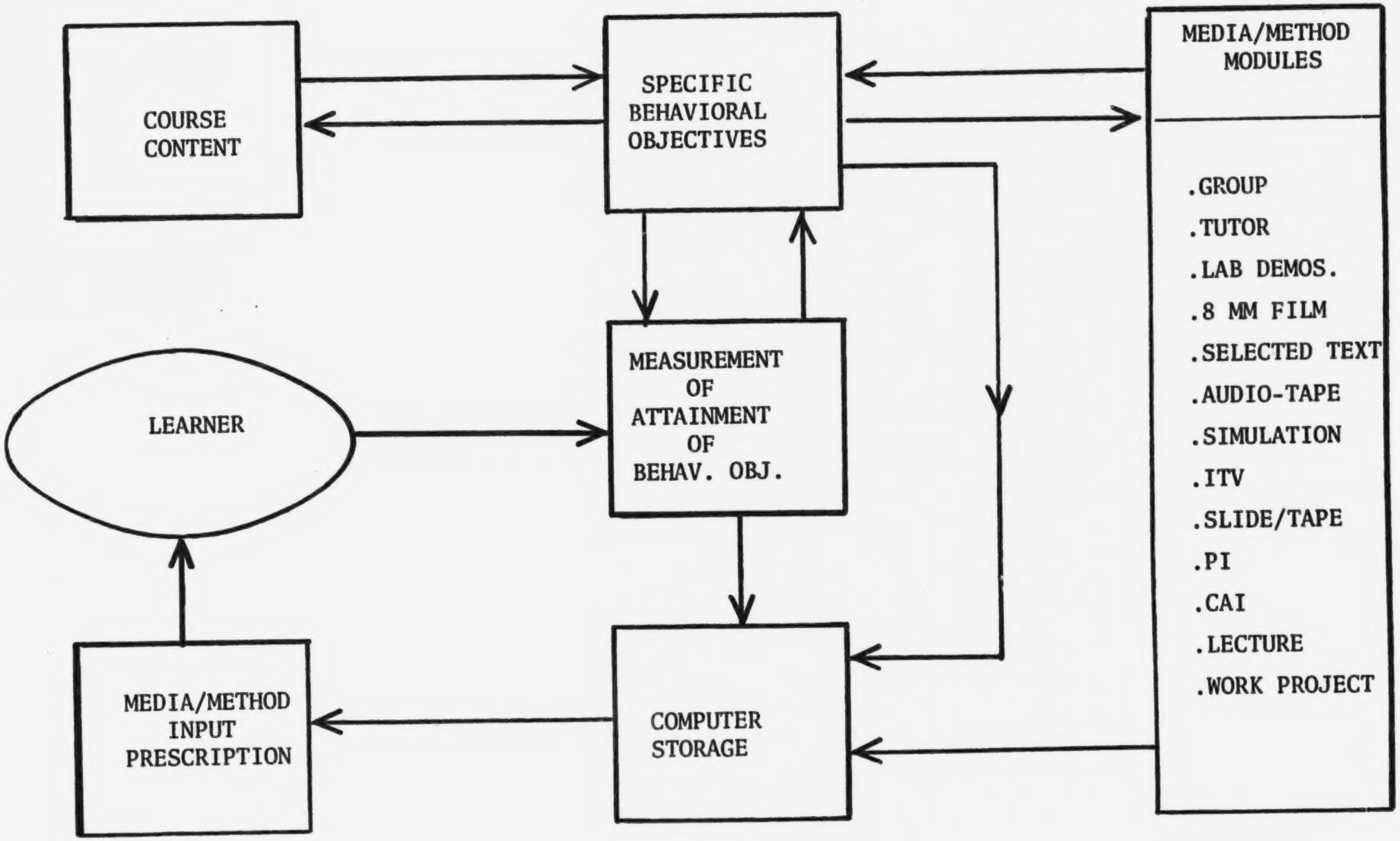
The Program Plan

These and other experiences point up the need for a coordinated research effort that can lead to the construction of an "organic" curriculum.

A research project for which there is pressing need is a parametric experimental analysis of the instructional process. The first step in this experiment would be the definition of the behavioral objectives for the content of selected courses and the instructional strategies would then be planned. These strategies involve the selection or design of modular instructional activities which would use whatever media or method or combination of these that appears to be most appropriate for the attainment of the objectives. The method/media mix for any given sequence of objectives might include programmed instruction, single concept films, text readings, tutorial sessions, group discussions, computer-assisted instruction, slide-tape presentations, etc. The optimum mix of learning experiences would be developed by systematically varying the method/media permutations and testing for their teaching effectiveness. (Figure 2 is a functional flow chart of a systems-designed instructional model.)

MODEL FOR A SINGLE COURSE INSTRUCTIONAL SYSTEM

Figure 2


COURSE CONTENT
SPECIFIC BEHAVIORAL OBJECTIVES
MEDIA/METHOD MODULES
.GROUP
.TUTOR
.LAB DEMOS.
.8 MM FILM
.SELECTED TEXT
.AUDIO-TAPE
.SIMULATION
.ITV
.SLIDE/TAPE
.PI
.CAI
.LECTURE
.WORK PROJECT
LEARNER
MEASUREMENT OF ATTAINMENT OF BEHAV. OBJ.
MEDIA/METHOD INPUT PRESCRIPTION
COMPUTER STORAGE

This validation of the learning experiences requires sensitive and sophisticated instruments for frequent measurement of behavioral objective attainment. Implicit in this system is that the student only learns what he doesn't already know and that he will move as rapidly as his ability and motivation permit.

The behavioral objectives and information about what method/media combinations are most appropriate for teaching students of varying abilities and interests are then stored in a computer. When the student enrolls in the course, he is measured in terms of his entry performance on a representative sample of the behavioral objectives and this information is fed into the computer. The computer then looks at the characteristics of the student and how much he already knows and prescribes an empirically validated learning package for him. When this package is completed, the learner will be retested and the next learning package will be prescribed.

This will be "programmed instruction" in the broadest and most desirable sense. The student will have almost immediate knowledge of results, will work at his own rate and will have a high proportion of success experience in the learning situation. It is likely that much of the material in this system will be self-instructional.

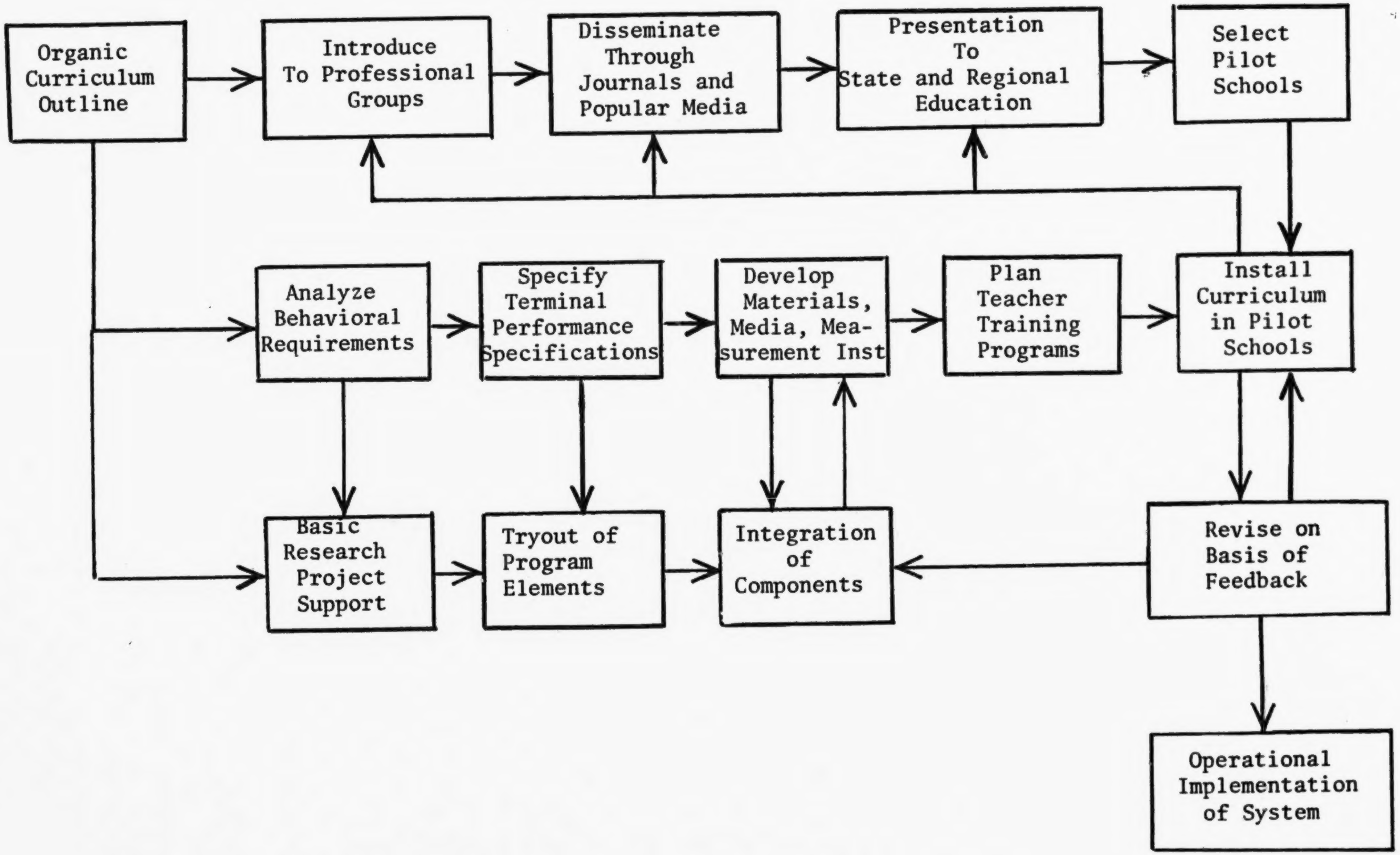
While this experiment involves only single courses, the model should prove equally effective with an entire curriculum. The utility of such an instructional system in the curriculum that has been described should be clear. Indeed, the curriculum visualized probably could not work without such a flexible and individualized instructional program.

A study that systematically analyzes the effect on learning of all the major variables should have great value for educational planners but it is only a first step in building an optimum curriculum. Shown in Figure 3 is a functional flow chart identifying some of the more obvious activities that must be undertaken. Behavioral objectives must be defined and classified so that they are acceptable and useful to the pilot schools. Indeed the teaching staff and curriculum planners and administrators of these schools should become intimately involved in the effort at its inception. Much research and validation of program elements must be completed before a new system can be installed in a school for practical testing. The criteria for measuring the success of a systems-designed curriculum must include longitudinal data on the post-high school performance of the students.

As important as attempting to build a demonstrably superior educational program is taking all the measures necessary to insure its acceptance by professional educators and parents. An exotic program that is not feasible for adoption in other schools will be of little value. It is encouraging to note that the resources essential to such an undertaking are available and that there are schools willing to participate in these innovational activities. The concept of a truly integral and excellent educational experience can become reality for the Nation's young people.

PLAN FOR IMPLEMENTATION

Figure 3


Organic Curriculum Outline
Introduce To Professional Groups
Disseminate Through Journals and Popular Media
Presentation To State and Regional Education
Select Pilot Schools
Analyze Behavioral Requirements
Specify Terminal Performance Specifications
Develop Materials, Media, Measurement Inst
Plan Teacher Training Programs
Install Curriculum in Pilot Schools
Basic Research Project Support
Tryout of Program Elements
Integration of Components
Revise on Basis of Feedback
Operational Implementation of System

III. ORGANIZATION OF OCCUPATIONAL EDUCATION AND TRAINING

A. Report of Workshop Discussion

A Planning Model

Training Responsibilities of the Employment System

A "Second Educational System" and the OTO Concept

The United Kingdom Industrial Training Act of 1964
by Lady Gertrude Williams

The OTO Device - A Discussion of Ways and Means
  At What Level is the OTO Feasible?
  The Structure of an OTO
  Financing the OTO

Where is Occupational Training to be Done?
  The Role of the Vocational High School
  Traditional Education Too Rigid, Too Exclusive, Not Realistic
  Comprehensive vs. Specialized Secondary Schools
  The Evolution of the Vocational High School

Special Institutions for Occupational Training and Retraining
  Advancement and Retraining - For Adults Only
  Abridging Institutions
  Resource Allocation
  The Training Officer
  Teacher Training and Retraining
  New Types of Institutions Needed

B. Workshop Papers Appended to This Section

The Institutional Choice for Vocational Training in Latin America
by Joshua M. Levine

Educational and Vocational Guidance in Singapore by H. Keng-Howe Chan

A Look at the Proposed Plan for Improvement and Enlargement of Occupational Education in Thailand by Nikom Chandravithun

Tunisian Experience in Adaptation of Technical Education and Occupational Training to Employment Market Needs by Mohamed Ennaceur

III. ORGANIZATION OF OCCUPATIONAL EDUCATION AND TRAINING

A. A Report of Workshop Discussion

A PLANNING MODEL

Dr. Staley recapitulated briefly the conceptual framework for planning occupational education and training set forth in his Planning document, which had been circulated to Workshop participants.

Ideally, he said, the preparation of persons for good performance of occupational roles should include four functional phases or stages. In practice, of course, some of these functional phases are very inadequately provided for, even in the most progressive countries. But this is an analysis of functions that ought to be provided for; the aim is not to say what is, but to set a target at which planners and policy makers can aim.

Phase 1 is general education. Everyone in any occupation of modern type (and development planners seek to modernize the economic, social, and political systems) needs certain basic knowledge, skills, and personality traits in order to perform well. For example, he needs some communication skills (reading, writing, perhaps a foreign language), some skills in computation, some knowledge about the physical, biological, and social environment, and attitudes and habits conducive to good work. The role of general education in occupational preparation is to provide fundamentals that are needed in nearly every occupational role, or at any rate in a great number and diversity of occupational roles. General education, of course, has other purposes besides helping to prepare people for citizenship and for individual self-development. But in this Workshop we are asking how to prepare people for modern occupations, and the first part of the answer is that good education is very important for this purpose, as well as for other purposes.

Phase 2, Dr. Staley continued, is general education plus pre-occupational education. (Note that we are still talking about education, not training.) This phase should come in the last two or three years before the individual leaves the general education system to seek a job or to get specific training in a specialized institution. It may occur, therefore, at several different levels on the educational ladder, from primary to university post-graduate. Three elements in particular are included in the term "pre-occupational education": (1) information about the kind of occupations potentially available to the individual and about the requirements for successful performance in each, (2) counseling and guidance to assist the individual in realistic appraisal of his own capabilities and interests (using aptitude tests and other techniques where appropriate) so as to encourage good occupational choices, and (3) based on and contributing to the foregoing, instruction in and if possible practical work on fundamental elements pertaining to some broad family or cluster of occupations (for example, commercial occupations, mechanical occupations, or occupations in such fields as health, graphic arts, homemaking, etc.).

Phase 3 is job-entry training plus further education. (Note the shift of emphasis from education, defined as the learning of broadly applicable knowledge, skills, and personality traits, to training, which is specifically focused on a particular task or a set of tasks making up a job or occupation.)

This shift from education to training should occur, says this ideal model, at or near the point of entry into a job. At least, there should be a strong commitment by the individual to a particular type of job. In the old days, job-entry training was handled by apprenticeship or by entirely informal learning. The more modern concept, found in the better-managed employing organizations, is systematic induction training covering either a short or long time period and using a variety of methods adapted to the specific needs of the job. Also, and this is a principle insisted upon by the U.K.'s Industrial Training Act, the training should be accompanied by further education to provide a broader base.

Phase 4 is career-long opportunities for further training or retraining plus further education. This is a much neglected area in nearly all countries and one in which well-planned investment of efforts and funds would be likely to yield a handsome pay-off. There are three purposes in particular to be served by career-long opportunities for further training and further education: (1) renewal of skills and knowledge, keeping up to date with technological and other changes, as when a physician learns about a new medicine or a plumber about a new type of plastic pipe; (2) advancement within an occupation, as when an unskilled worker acquires skill, or a skilled worker rises to be a foreman or a technician, or a technician, by additional education and training, becomes an engineer; and (3) transfer from one occupation to another, as in the case of a coal miner retraining to be an electronics repairman, or an auto mechanic to be an insurance salesman.

Dr. Staley then referred to a difficulty that he had found in his four-phase model. There are many situations in which people do not, in fact, characteristically move directly from a formal educational atmosphere into a specific job-training atmosphere. That is, they do not move directly from phase 2 to Phase 3, but instead go through a specialized institution which provides some of the pre-occupational education of Phase 2 and some of the specific job-training of Phase 3. This is true of people preparing to be medical doctors, for example. In pre-medical education and even in the first years of a good modern medical school much of the time is spent in learning fundamentals of biology and biochemistry and so on, which can be classified as pre-occupational rather than specifically occupational, in the sense that these fundamentals are broadly applicable to a great many different specialties in the health field or even in other fields. But then as the medical student progresses and moves toward the clinical portion of his preparation he must give attention to a narrower range of things which only the physician needs to know, and he must at length focus on one among the many possible specialties. His work becomes more and more specific, and finally there is a period of interneship which constitutes very specific training. The transition is gradual and institutionalized, funneling down from broadly applicable "education" to very specifically focused "training." The same sort of thing takes place in the preparation of other kinds of professional people, technicians, managers, and others. There seems to be a transitional phase which bridges from Phase 2 to Phase 3 and partakes of some of the characteristics of each. Dr. Staley had therefore inserted into his model in the draft before the Workshop, a "Phase 2 1/2."

This "Phase 2 1/2" provoked a great deal of discussion, which finally led to the discovery that the alleged need for inserting this transitional phase into the conceptual scheme arose out of a confusion of thought. The sequence of four phases really should be understood as representing a sequence of functions to be performed. A separate, though obviously related, question is: What institutions should or do perform these functions? A given institution may contribute to more than one function. Instead of adopting the awkward "2 1/2" device, therefore, it would be better to maintain the simple four-phase sequence of functions and to study separately the proper choice of institutions for discharging the necessary functions. Dr. Staley accepted these conclusions and said that in revising his draft monograph he would adopt this better approach.

In the process of wrestling with "Phase 2 1/2" a number of thoughts of substantive importance were stimulated, and these are recorded in the condensed account below:

Dr. Rao: I sense a certain artificiality in the classification, created in part by designating a "Phase 2 1/2" after "Phase 2." There are transitional phases also between 1 and 2, and between 3 and 4. In fact, there is a transitional phase at the end of every one of the education or "training" steps. Why just at 2 1/2?

Dr. Staley: Isn't it because we create special institutions at this point, bridges between Phases 2 and 3? I mean, institutions such as law schools, medical schools, agricultural schools, and schools for training technicians.

Lady Williams: Dr. Staley, don't you think that perhaps the mistake here is in giving it that number? I think the real point is, not that this is a transitional stage, but that it is an entirely different sort of institutional organization which is conditioned by certain sets of circumstances in an economy or in a particular group of occupations.

Dr. Rao: I would like to put transitional institutions outside the 1, 2, 3, 4 structure and have them related to each one of these phases that we are talking about.

Mr. Ennaceur: In my country, some few years ago, education for many craftsmen was merely in the fundamentals of their religion, and they learned their skills without what we call, now, an education; traditional handicraft skills were learned directly from the older skilled workers. This doesn't mean, of course, that we wish to continue this method. As Doctor Staley said, we consider that education must precede training and employment, so our national educational system is growing and now includes all children six years and older. For those persons who have had no education, a special program of adult education, in the field, in the cooperatives, in the industries, and in the farms is organized for some 200,000 adult workers. This last program confirms the fact that in the case of workers who have gone directly into employment their lack of education has a certain impact on their productivity, even on their own promotion, and certainly on the development of the economic activity where they are utilized.

Mr. Nikom: We seem to agree that all the phases suggested by Professor Staley do not always or necessarily run successively.

Dr. Staley: Yes, I see that much more clearly now. And with respect to my "Phase 2 1/2," we are really talking about special institutions which can be links between Phases 2 and 3 or which may perform other functions. For example, in mid-career a person could be sent to one of these institutions--an agricultural school, a polytechnic, a medical school--for further education and training. I'm delighted to have this much attention centered on "Phase 2 1/2," because it was a fuzzy concept with me.

Mr. Chan: This "Phase 2 1/2" is the link between school preparation and the world of work. It is a focus on inputs into the labor market. Also, the progression from one of Dr. Staley's phases to another is not necessarily a linear one; it can even be cyclical, going back from 4 to 1.

Lady Williams: Can I make a very revolutionary suggestion? The point is that "2 1/2" is not in progression and it is not transitional; it is outside. Let us stop calling it "2 1/2" and call it "xy." It is a new kind of animal, a different animal from phases 1, 2, 3, 4.

Mr. Levine: I am grateful to Dr. Rao for pulling out of Dr. Staley the comment which I think throws light on this, which is that he put this concept a little bit aside because it represented a special kind of institution. I think the question that we have all really been examining is "What are the proper institutions for carrying out functions 1, 2, 3, 4 or combinations of them?" I would like to see there (referring to a diagram on the blackboard) two columns, one which would read "Education or Training Required" and the other "Institutions Required." So "xy" to me is an institution.

Mr. Chan: (Drawing on the blackboard.) I would make the diagram circular and put xy in the center, because then one can get into xy from any direction. Such a cyclical progression would represent a situation where, if you are deficient in any particular phase of this four-phase progression, you could go into the center for refurbishing or whatever help you need.

Dr. Staley: This discussion has been illuminating. Aside from the fun of inventing names and drawing diagrams, we have been getting at an important point. There is a definite need in our system, in all systems, at whatever level, for some specialized institutions which are occupationally focused and constitute a bridge between general education and very specific training for a particular employment. It should be possible to enter them from either end, from the general education end or from the employment end. Perhaps one of our main problems in planning occupational education and training is to think through what kinds of specialized institutions are needed, under what circumstances they are needed, and under what circumstances they are only in the way or too expensive.

It seems to me, as to some others who have been studying these questions, that as a general principle the provision of broad, general education plus a certain amount of pre-occupational education should be the responsibility of the formal educational system, while training for specific types of jobs should, in general, be the responsibility of the employment system and should be carried on in employment or, at least, after a strong commitment to a certain type of employment. But this is not the same thing as saying that all education should be in institutions and all training should be non-institutional, on the job. In many situations, occupationally-specialized institutions for training purposes have important advantages as compared with, say, training programs carried out by employing establishments directly. I have tried to jot down a few criteria by which to identify such situations. Specialized training institutions may be more effective or more economical, or both, where one or several of the following conditions are present:

First, where there is a reasonably large and continuing demand for persons with a particular kind of training and this demand comes from scattered employers or from self-employment--for example, automobile mechanics, stenographers, lawyers, phsyicians, and certain kinds of clerical occupations or selling jobs.

Second, where there are significant economies of scale in training a group of people together.

Third, where the employers cannot do their own training, or cannot do it effectively or economically, because the employing units are too small or for other reasons.

Fourth, where training is needed for anticipated new industries requiring new occupational skills not possessed by the country's existing employers, which means that on-the-job training is not feasible (unless by sending trainees abroad).

Fifth, where the quality of training available in the country's own employing units is low, because of backward technology and management in the existing employing units of the sector concerned.

Sixth, where it is necessary to train trainers and thus "prime the pump" of a training program.

It should be noted, though, that even where some of these circumstances make it desirable to have special training institutions, some additional training by the employing establishment itself is usually desirable at the point of job entry; this induction training would deal with the peculiar requirements of the specific employer and the specific job.

Training Responsibilities of the Employment System

In a number of sessions covered in this section the Workshop focused on the organizational problems surrounding an occupational training program designed to advance a country's development. These were such problems as: "Who is to be responsible for providing the training?" "How is training to be done--through what institutions and techniques?" "How is it to be financed?" and, of course, "How do any principles agreed upon apply to countries at different levels of development?"

The first question to which the Working Group on Organization addressed itself was that of determining to what degree the responsibility for occupational education and training rests with the formal system of state education and to what degree it rests, or should rest, with the employment system--industry, agriculture, commerce, government, and service industries. Closely related to this was the question of whether and how the level of economic development of a country would affect this issue.

It was rather readily agreed that it is the principal task of the formal educational system (Phases 1 and 2 of the planning model) to turn out educated people who are "trainable," not trained, and that the employment system should be charged particularly with the task of occupational training and retraining (Phases 3 and 4). Adequate discharge by the employment system of its training responsibility would in most cases be facilitated by establishment of some type of occupational training organization (OTO). The further education that must accompany training should be the responsibility of the school authorities, who should have the close cooperation of the employment system through the OTO. The manner in which this could be done was not so easily agreed upon, but the importance of locating training itself in an employment atmosphere was unanimously recognized. It was felt that the special type of training and education requirements dealt with in Phase 4 of the model (further training and retraining throughout the working career, with further education) should also be a shared concern of the employment system and the school system. However, lack of time prevented any real consideration of the proper institutional organization.

Two major advantages were seen in placing responsibility for specific occupational training in the employment system wherever possible. To begin with, training given in the employment system itself is likely to be more appropriate and realistic than anything which could be set up in the formal educational system, and it is more likely to be responsive to the changing conditions of modern industry. Secondly, the cost of such training--although difficult to assess--should be less (or of higher quality for a given expenditure) when given in the employment system, because both appropriate equipment and well-qualified instructors are more likely to be at hand. Furthermore, in accordance with the principle that the user (the employer, and through him the consumer of the product) should pay, it seems appropriate that industry should bear this cost. However, it is worth emphasizing that the object of training is to increase the worker's productivity, so that training is actually a cost-saving, rather than a cost-generating practice--or should be after its initial period. An additional bonus for training at the point of employment is that the waste of effort and expenditures on persons who do not enter the occupations for which they receive training is largely avoided.

A "Second Educational System" and the OTO Concept

The Workshop gave much attention to the "second educational system," meaning the great variety of organized and unorganized learning experiences outside the formal educational system which serve to improve the competence of young persons entering, or about to enter, employment and of employed persons throughout their working careers. Dr. Staley had emphasized the importance of this second system in his Planning Document and was heartily seconded in this by Dr. Frank and others.

The concept of an institutional mechanism designed to build up and improve this second system also received much attention. This concept came to be referred to as "the OTO," a shorthand expression for some type of occupational training organization. Examples of various alternative patterns of organization for an OTO were drawn from various countries, especially from Latin America and the United Kingdom.

The OTO was seen as the link between the formal educational system and the employment system. By combining the interests and the expertise of public and private employers, educators, labor, and government in planning and coordinating, the OTO can mesh a comprehensive program of occupational education and training to a country's development objectives. Being occupationally focused, it would be responsible (in Planning Model terminology) for the Phase 3 job-entry training and Phase 4 retraining tasks. It would advise in Phase 2 pre-occupational education and Phase 3 and 4 further education. In all cases the OTO needs a strong staff headed by a full-time administrator of high competence with sufficient prestige to inspire confidence and cooperation in the worlds of industry, commerce, labor, government, and education. The OTO should follow the policy of persuading and subsidizing other organizations--employers, schools, and training centers--to undertake a large share of the actual training work. It should also cooperate closely with productivity centers, small industry service institutes, management associations, labor unions, and other agencies that are able to run good training programs. Where necessary, it should subsidize their training programs, besides assisting in the training of instructors, preparation of materials, and in other concrete ways.

Only where others cannot do the job that needs to be done, even with help from the OTO, should the OTO itself directly undertake a training task. In practice, it may have to do a substantial amount of such work in a newly developing country because facilities and staffs are otherwise not available. For this reason, and also to discharge some of its other functions, the OTO may need to establish special schools or training centers of its own. Nevertheless, the general policy should be to hold this within reasonable limits in order to encourage a more decentralized and pluralistic approach and, especially, to make maximum use of the facilities (equipment and personnel) of employing organizations themselves.

Very high priority should be given by the OTO to: (1) analysis of current and future needs for occupational education and training, (2) education and training of instructors and training officers, (3) preparation of training materials and experimentation with new materials and methods, (4) setting of standards for, and inspection of, aided training programs, and (5) preparation and administration of examinations for testing attainment of a certain level of proficiency in specified types of occupational education and training.

The United Kingdom Industrial Training Act of 1964

by

Lady Gertrude Williams[1]

Highlighting the discussion of the occupational training organization was Lady Gertrude Williams' discourse on a very new and important OTO. Lady Williams herself played an active part in bringing into existence the legislation on which it is based. The important innovations initiated under that legislation are having a profound effect on education and training for industry in the United Kingdom. The Workshop listened with great interest to her firsthand account of why and how one country organized an OTO. Her talk is reproduced *in extenso* below.

The United Kingdom is the oldest industrial country in the world and very traditionally minded. Innovations are not easily achieved, and so it is likely that practices, as time goes on, become less and less appropriate to a changing situation. That I think is what happened in England, not with the specific training so much as with the organization of training. I think I could say that in the most training-conscious firms the training program was probably equal, if not in some cases superior, to anything in the world. The problem was however that this was not the average training. Nor was it in any sense universal. There was an enormous number of firms in which the training fell far below what were our requirements.

I should say perhaps that most of our organizations in Britain are, whenever possible, voluntary organizations; and this is particularly true in the field of industrial relations. We have had trade union organization for a hundred and sixty years, so that the greatest part of the relationship between employers and workers is a matter of collective agreement and not at all of legislation. These collective agreements are voluntarily maintained. There is absolutely no legal sanction to them whatsoever; so that if an agreement is not kept, it rests with one or other of two protagonists to take steps. Even on a wage agreement, there is absolutely no legal sanction whatsoever. The state never steps in, even if an agreement is broken. And this, I think, is important because it does have a very direct bearing on the way in which our industrial training shapes up.

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The whole of our industrial training up to 1964 has been embodied in such collective agreements. They have been agreements between employers and trade unions as to what should be the form of the training, what curriculum should be followed, that only those who have followed those curricula should be engaged in the particular occupations for which the training was designed. And there have been very serious repercussions by trade unions if employers have attempted to employ persons who have not gone through the requisite form of training wherever it applied to skilled work.

These collective agreements were confined entirely to what we call the skilled trades--in the UK about 40% of the wage earning population. But these workers are not spread evenly over the whole of the economy; they are concentrated in one comparatively small--but very important--group of industries. These are all the branches of engineering, all the branches of building and construction, as well as printing and shipbuilding. These groups comprise about two-thirds of all the skilled labor in the UK, so that it became a matter of very great concern that there was a constant shortage of skilled manpower in these industries. This, despite the fact that we had very extensive collective agreements which--so it seemed on paper--were going to provide a constant supply of adequately trained, qualified personnel.

The fact was the skilled workers were not appearing in adequate numbers. And the shortage in some trades in these industries was so great that one sometimes had perhaps fourteen vacancies for one applicant. Well, this, of course, was a matter of great concern to our export trade; and it was a matter of great concern to industry generally because so many of these skilled industries were providing the key products for other industries that were not anything like so skilled. Engineering, for example, was providing the tools for industries that were primarily mass producing industries. So that, if you couldn't get the tools, the mass producing industries were held up as well.

These conditions led to a thorough reexamination of the reasons for this continuing shortage despite what seemed, on paper, a very large number of excellent agreements about the training of skilled workers. We found a number of factors which I will mention because they are, I think, probably found in a very large number of countries as well as the UK.

The first is that our training scheme had not taken account of the very big change in the structure of industry. As in most industrial countries, we have huge firms that make the headlines, but the majority of employers are of a comparatively modest size; and it's the small and modest-size firm that is typical. We have found that in this typical moderate-size firm and the small firm it no longer pays to do the training they formerly did. This is partly because the hours of work are much fewer than they used to be, partly because the wages of adolescents have risen so very greatly that they're no longer cheap labor, and even more particularly because the tendency has been for the modest-size firm to concentrate on a narrow range of products or on ancillary processes for the bigger firms. Thus, even if they were prepared to train, they haven't the facilities to give a comprehensive training experience.

The second factor we found was that technological change had introduced a different kind of skill. No longer was a purely manipulative skill required. Rather, very much more understanding was required of the principles upon which the job was based if the worker was to be able to use his skill in a whole succession of jobs which did not even exist at the time of initial training. Therefore, you needed very much more theoretical education than was usually being given. Now it was part of all our collective agreements, without exception, that young people should be given release for one day a week to get this theoretical education at the local technical college, or what we call the "college of further education." In fact, however, a very large number didn't get it because there were no legal sanctions. It rested with the employer as to whether he was, or was not, prepared to release these workers. In some industries the response was very good, but in others it was exactly the opposite. So a great many people were not getting this further education.

The third factor presenting a very great difficulty was that the collective agreements made up between trade unions and employers associations embodied a very large number of restrictive trade union practices which were a legacy from the past. One of those, which I believe is unique to the UK, was a very precise age restriction. Training had to be done between the ages of 16 and 21 and no other time. So that if for any reason a youth went out into employment later than 16, or went into employment which was not included in one of these training agreements, and later--because of his interest in work--wanted to become a skilled worker, he was prevented from doing so, as he was already too old to be able to take the prescribed training for the prescribed period of time and still finish by the age of 21. That was both unjust to young men, because it meant a large number of young people never got the training that they had the capacity for, and it was also a very great loss to industry, because it meant a continuing shortage of skilled workers.

These then were the factors we found to be accounting for the shortage of skilled workers, but they did not account for its uneven quality. As we have noted, the best firms were training in a way that was superior to, or as good as, anything in the world; but they were the minority. A very large number of firms had training schemes that were presumably training people for skilled work, but in fact were not doing it. And there was no means of compelling them to do it because there were no tests whatsoever. At the end of the period of training as shown in the collective agreement, the trainee walked out as a skilled worker. He may have been an absolute dolt. He may not have been given the training that the employer had promised to give. He may have proved very useful in a particular process and been kept at the process the whole of the five years. Nevertheless, because he had entered as an apprentice in the prescribed way and finished the prescribed term, at the end he was counted a skilled man. This, of course, was very undesirable because it meant that a very large amount of what was ostensibly skilled work was being done by people who had not really the knowledge, experience, and training to do it. It was these problems that the Industrial Training Act has tried to solve.

Because we in the U.K. are so wedded to the voluntary principle, it was decided not to impose a particular form of training on anybody at all. What we have aimed at in this Act, and I think really we have succeeded, was to provide a framework which was sound but to leave the greatest flexibility possible to each industry so that details would be decided by the people in the industry who know it best. What the Act does, therefore, is to set up a kind of machinery--an organization. It compels an industry to set up an Industrial Training Board. This is statutory, and the form that this statutory board takes, again, is laid down in the Act. It must be composed of equal numbers of employers and of trade unionists (workers); but it must also contain a significant number of educationists.

This is the first time that it has been accepted that the community (represented by the educationists) has a responsibility and a part to play in the training of people for employment. Previously it was entirely thrown onto industry--employers and workers--through their agreements. The only part played by the state was in providing the theoretical education, free of charge, if employers released their workers to go to the classes. The state played no other part in laying down what it should be or in compelling them to attend those classes. Now, by including educationists on every board, it is intended to show that the preparation for employment is, at least in part, an educational function.

So this is the pattern of every industrial training board. There are at the moment 21 boards already in operation. It takes time to set up these boards, and it is thought eventually there will be thirty to cover the whole of the economy. By the end of this year they will cover at least 15 million workers; i.e., well over 60% of the occupied population.

The Industrial Training Boards have certain statutory functions. There are certain things that, by law, they must do. There are a whole lot of other things that they're permitted to do, but there are two things that they must do by law. As a matter of fact, these are the important things, because most of the other things follow from them.

The first thing they must do is to insure that there are appropriate schemes for the training of everybody in employment--not merely skilled workers, but everybody. This includes, of course, different kinds of training, different lengths of training, different degrees of theoretical content and so on. But the boards must be sure that there are appropriate schemes of training for everybody from the least skilled worker right up to the top management. Everybody of any class or grade in the industry is to be included.

The second thing that is compulsory is to impose a levy on every firm within the scope of the particular industry board. The size of the levy is the industry's own business. Employers and employed agree on whatever is the appropriate levy. But that they must impose a levy is law, and it must be imposed on everybody in the industry. Out of the fund thus collected, grants are paid to any firm which shows that it is providing the prescribed training--at least the standard that the training board demands. A firm can do better than the standard if it likes, and there are all sorts of schemes for getting higher grants if it does so; but no grants at all are forthcoming unless the training is at least of the standard prescribed by the training board. This means that for the very first time there is a right of inspection, since a firm can't claim its grant unless it can show through inspection that the training is up to standard.

Now these are the essentials of this levy-grant system which is, of course, the teeth in the whole of the Act. This is what gives an industrial training board its power, as the board can't compel any firm at all to train anybody at all. But as a firm has to pay the levy, it has a very strong incentive to train in order to be able to claim the grant. In this way it is believed possible to combine individual freedom with compulsion through the strong incentive to try to retrieve some of the money the law requires the firm to pay out. So far, this seems to be working.

There are other extremely interesting experiments which should be noted. For example, both the shipbuilding and the construction boards experience very great difficulty in training young people who are not in the area where a big firm is operating a training scheme. So both boards are experimenting with setting up their own collective training schemes. The construction board has set up one such scheme in East Anglia, not a very highly industrialized area. The shipbuilding board has done so in Southampton as, of course, shipbuilding includes boatbuilding, and there are a lot of very small boatbuilding firms which cannot do their own training. These collective schemes look as if they're going to be very much copied by other training boards or expanded in other areas.

Then some of the boards are organizing and financing group training schemes for a group of firms too small to be able to do their own training. The training board finances this group training, partly out of state funds. Obviously, there is a great deal of administrative expense in setting up a scheme, and levy funds are not available until the first year has passed. So the state provides a very considerable sum of money to pay for the initial expenses.

Another aspect is the requirement that the training board arrange for training everybody, including retraining adults. The state again is prepared to finance these special schemes of adult-retraining if the firms are prepared to undertake that retraining. Instead of coming out of the levy, it comes out of state funds.

Already the biggest training boards, as well as the Ministry of Labor, have insisted that they will not pay grants to any firm unless there are certain conditions fulfilled. All training for the kind of job that requires at least a year's preparation (not yet for operative training) must include adequate provision for additional theoretical knowledge--for further education in what we call "related subjects." What are "related subjects" is a matter of some controversy, and that's why the curriculum part of it is interesting. In the engineering and construction fields the first year of substantial training must be basic and nonspecialist, and it must be off the job. It must be an organized, integrated scheme of training which acts as a foundation before people go into production. These are the essentials of claiming a grant if there is a substantial amount of training involved.

The industrial training boards are self-governing, but their main policies must have the approval of the Minister of Labor. This policy is conveyed to the Minister by the Central Training Council, which has no executive power but is purely advisory. However, as all schemes have to be approved by the Minister of Labor, the Central Training Council can always advise him not to approve a scheme, so that it has a considerable amount of indirect power. This Central Training Council is composed again of representatives of our employers' general central organization, the Confederation of British Industry, and representatives of the Trade Union Congress (TUC), which represents all the trade unions. It also includes a certain number of representatives of the nationalized industries, some representatives are chairmen of the industrial training boards; a very large number of educationists, and just two or three independent members like me, who in a sense represent the community as a whole.

The main work of the Central Training Council is done through its committees, which are quite interesting. Inasmuch as all industrial training boards have certain problems in common (for example, the problems of people who are engaged in commerce or in clerical work), it was thought absurd for every board to work out its own schemes on these problems. The Central Training Council therefore has a Commercial and

Clerical Training Committee which has worked out the training programs it advises the training boards to accept as their schemes for grants in their industries. They could refuse, but they haven't done so as they find it naturally worthwhile to accept. There is also a committee on the training of managers which is reporting on a course of training that will most likely be accepted by the Council to be eligible for grants for training managers wherever it is used. Another very important committee is that on the training of training officers. Obviously, it is impossible to have good training schemes unless there is somebody who knows how to identify training needs, how to organize a training department, how to see that the work is done, and so on. These people are not simply instructors. Training officers are part of the management team, but specially concerned with the training function.

Another committee of the Central Training Council is the Research Committee. Anybody at all--a university, an individual, or a research institution--can propose a research project to the Research Committee if they believe the results will be valuable for the training of people, whether it is how to do a job analysis, how to use programmed instruction or visual aids, how you validate a training program once you've got it--whatever it is that has a direct bearing on industrial training and is not pure scientific research. If it has a practical application in the training field, the Research Committee recommends that funds be made available to carry out the work.

The Industrial Training Act has only been working two years, and it takes time after the boards are set up before they can get into operation. But it is now getting into its stride. The important thing is how quickly it will really provide the United Kingdom not only with an adequate supply of skilled workers but with intelligent operatives, semi-skilled workers, unskilled workers, supervisors, and managers. This Act has been an attempt to deal not only with the skilled manual worker, but it has also in one bound tried to transform the whole concept of training so as to bring appropriate preparation for everybody in every grade, whatever kind of work he's doing.

The OTO Device - A Discussion of Ways and Means

The OTO device exists in the United Kingdom and in Latin America in widely differing settings. Mr. Levine felt that this is a demonstration of its flexibility, which permits it to adapt to a very wide range of circumstances. On the one hand, the U.K.'s highly industrialized economy with large numbers of skilled workers found itself still shorthanded, with many jobs for every worker available. The largely catch-as-catch-can "sitting by Nellie" training system was not supplying the demand. Then the Industrial Training Act of 1964 was devised to speed up and rationalize the flow of skilled workers, and, so far, it appears to be working well.

On the other hand, in Latin America's much less developed economy another type of training problem had appeared, characterized by a surplus of workers but a severe shortage of skills. Here, a different group of OTO's (SENAI and SENAC in Brazil, SENA in Colombia, INCE in Venezuela, INACAP in Chile, CONET in Argentina, SENATI in Peru, INA in Costa Rica, and SECAP in Ecuador) grew up with the ILO's help. The earliest of these national training services was SENAI in Brazil, founded in 1942 and represented at the Workshop by Mr. Araujo. These organizations exchange ideas and cooperate in study programs under the aegis of the ILO's Latin American affiliate, CINTERFOR, represented at the Workshop by Mr. del Campo.

In Latin America the flow of secondary vocational school graduates was largely a drug on the market because industry was not aware that these persons could be effectively used. In fact, in many cases where they were eventually hired, they became personnel problems because their school-nurtured attitudes led them to feel themselves to be better than other workers, who differed, of course, and acted accordingly. In other words, there was no effective demand for the product of the vocational schools.

The OTO helps to solve (in Mr. Levine's opinion) a wide range of both quantitative and qualitative problems that arise out of training in the formal school system, where there are a certain number of places to fill in certain trades, regardless of current needs or effective demand, and where last year's curriculum will be continued even if today's technology has changed. Constructed as it is to include representatives from both education and industry, the OTO can, at the same time as it trains workers, create effective demand by educating the employing community to realize that they do, in fact, need trained workers. It can also concentrate its efforts on training or upgrading workers who are already employed, so that resources are not wasted on persons who may drop out of school, or who, once trained, will work in other occupational fields.

It has no difficulty keeping up with technology, since it trains in the context of existing employment, and often at the site of employment. And, of course, the worker himself is producing during at least part of his training.

At What Level is an OTO Feasible?

Mr. Ennaceur stated that, in Tunisia, industry does not feel that it has any responsibility for training workers, and, in any case, there is a great shortage of highly-trained personnel who could act as instructors. So the first task there is to provide more trained persons and then to convince industry--perhaps by a tax--of its responsibility. The question is how best to do this.

It was agreed that the mechanism for achieving a good occupational training program must be designed with the specific needs, the stage of industrial advancement, and the cultural background of a given country in mind. One pattern cannot be expected to fit all countries. Lady Williams cited the system of Industrial Training Institutes in India, which exist apart from both the school system and the employment system, as being perhaps more appropriate to a newly developing country than the United Kingdom's system, which depends at least in part on the prior existence of large numbers of skilled workers. In India it was necessary to have special teacher training institutes set up to train the instructors required by the Industrial Training Institutes themselves.

Mr. Levine felt that probably industry could be brought into the training picture in a developing country very much earlier than might be suspected, and Lady Williams noted that, in any case, it would be a mistake even to set up the training program initially inside the school system because this would create vested interests which would be reluctant to hand the task over to industry when industry was able to take it on.

Mr. del Campo spoke of the efforts in Latin America to deal with a similar situation where there was neither the tradition that industry should consider training as a part of its responsibility nor qualified personnel with which to begin. Just imposing a new tax on industry would have accomplished little, so separate training institutions were established. They usually provide one year of in-plant occupational training for workers. Additionally, several kinds of seminars have been organized to train people in industry to detect and analyze the needs for training within their own firms.

Dr. Skapski pointed out that while Nigerian industry had earlier not been capable of undertaking a training program, it was now believed to be prepared to do something positive. The Nigerian Seminar recommended a 1% levy on payrolls and, also, that Nigerian industry should gradually

The OTO Device - A Discussion of Ways and Means

The OTO device exists in the United Kingdom and in Latin America in widely differing settings. Mr. Levine felt that this is a demonstration of its flexibility, which permits it to adapt to a very wide range of circumstances. On the one hand, the U.K.'s highly industrialized economy with large numbers of skilled workers found itself still shorthanded, with many jobs for every worker available. The largely catch-as-catch-can "sitting by Nellie" training system was not supplying the demand. Then the Industrial Training Act of 1964 was devised to speed up and rationalize the flow of skilled workers, and, so far, it appears to be working well.

On the other hand, in Latin America's much less developed economy another type of training problem had appeared, characterized by a surplus of workers but a severe shortage of skills. Here, a different group of OTO's (SENAI and SENAC in Brazil, SENA in Colombia, INCE in Venezuela, INACAP in Chile, CONET in Argentina, SENATI in Peru, INA in Costa Rica, and SECAP in Ecuador) grew up with the ILO's help. The earliest of these national training services was SENAI in Brazil, founded in 1942 and represented at the Workshop by Mr. Araujo. These organizations exchange ideas and cooperate in study programs under the aegis of the ILO's Latin American affiliate, CINTERFOR, represented at the Workshop by Mr. del Campo.

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Dr. Skapski pointed out that while Nigerian industry had earlier not been capable of undertaking a training program, it was now believed to be prepared to do something positive. The Nigerian Seminar recommended a 1% levy on payrolls and, also, that Nigerian industry should gradually take over the main responsibility for occupational training. A survey is at present under way by a British firm, with supervision by the chairman of the Nigerian Employers' Consultative Association, to determine the easiest way to set up industrial training boards in building and construction (Nigeria's largest industry), textiles, and printing. Although, Dr. Skapski observed industry will often give wrong information if it is merely asked how many of what kind of workers are needed, he felt that industry representatives who are members of an industrial training board will not long be content to be party to a scheme which trains the wrong number of workers in skills that are not needed. Thus even if the government must take an active part in establishing training facilities initially, this activity should be transferred to industry as soon as possible.

The Structure of an OTO

Discussion brought out the different forms which an OTO can take. In Venezuela, Colombia, and Chile an over-all organization deals with training programs in all fields--industry, service trades, commerce, and agriculture. In Brazil, SENAI covers only industrial workers, and four years after its debut another organization (SENAC) was created for the commercial sector. Lady Williams stressed the importance of examining the particular circumstances of the country to determine not only the type of training needed but whether to start with an over-all organization or with separate organizations which could be gathered under one umbrella. In addition to the level of development of a country, the dispersion of its population is a factor to consider.

Financing the OTO

The Workshop considered the various methods that are being used to finance the OTO and particularly the respective roles of industry levies and government subsidies. The system now in force in the U.K. has already been described. In a number of Latin American countries, financing of the training organization's activities is done through a uniform payroll tax--usually 1%, but occasionally 2%--levied on employers in the sectors covered.

In some countries, an employing establishment able to show that it is giving appropriate training receives a refund, which may constitute a considerable proportion of its original levy. In the absence of any system of special training levies, grants can be made from a government's general revenues to subsidize training.

Dr. Staley pointed to an important economic reason for some type of monetary reimbursement or reward to firms that do a good job of training. In the absence of any such system, there is a disincentive to training in that workers trained by a firm at considerable expense may be hired away by other firms that incur no training expense. Under the levy-grant system, while no firm is obliged to go into the training business--and it is recognized that some firms do not wish to divert their attention from their main business--at least firms undertaking this important function are not penalized.

One problem inherent in the financing of training by a levy on employers is the difficulty and expense of collecting the levy from very small firms. As a result, some countries have a cutoff point whereby no collection is made from firms below a certain size. This practice has two serious drawbacks. Since it is usually the smaller firms who do not have training programs, they are in effect being subsidized by the large firms that do train. And in many newly developing countries practically all firms are small. Thus most firms would be exempt and only a few firms would bear the major part of the burden. Mr. Araujo, however, stated that some of these administrative difficulties can be solved by having the social security agencies add the training levy to their usual collections.

Lady Williams objected to having a uniform tax rate for all industry, as the amount of training required by different firms varies enormously. Some industries employ a large proportion of skilled workers, while others have hardly any skilled workers. A tax which is adequate to provide the training for one kind of industry is more than enough to provide for others, while a tax which only provides for the firms requiring a small number of skilled workers is inadequate to provide training for numbers of highly skilled workers. However, despite these drawbacks, it was felt that in countries which are not highly developed, a differential tax rate would be administratively impractical.

Discussing the extent to which the state should finance the cost of training, Mr. Levine argued that on the basis of the "user should pay" principle, the amount of tax should be sufficient so that all costs fall on the employer of skilled labor. On the other hand, it was argued that this was not fair for two reasons. First, it is generally true that the amount and the kind of training given have a certain social content. That is, if an employer were to train entirely and only for his own use, he would not be giving the kind of training that would promote mobility of labor. Therefore, the worker trained by one firm would not have the skills that would enable him to find employment in other firms, even in the same industry. And if the state is going to insist on certain standards or a certain curriculum so that the training is more transferable, it should bear a part of the cost of training.

Secondly, it was felt that for industry to pay the whole cost of training made too great a distinction between professional people and skilled people. It is generally accepted in all countries that persons getting their occupational preparation in institutions of higher learning, such as universities, do in fact get this training very much below cost, as the state maintains these institutions. It therefore seems unfair that while highly qualified professional workers are educated partly or wholly at the expense of the state, workers at the lower levels of skill should be denied this benefit.

Mr. Nikom questioned the advisability of introducing the payroll tax into a country where industry is of recent origin and still struggling to survive and where employers are not ready to accept new ideas.

Mr. Chan cited the example of Singapore where, under the aegis of the Economic Development Board, a Light Industries Service helps to update and modernize traditional skills through a centralized training program. This service is entirely financed by the Economic Development Board.

Mr. del Campo felt that although the Chilean training organization--INACAP--has been financed from the start out of government funds channeled through the Chilean Development Corporation (because of the very heavy social security taxes already being paid by employers) it might be possible in a few years' time to begin collecting a training levy. Perhaps by then industry would have seen the results of the program and be willing to help finance it.

Dr. Zaidi went several steps further and stated his belief that in the newly developing countries if a small employer is good enough to contribute to the country's training program, he should receive a 1% rebate from his general taxes.

Dr. High reminded the group that the whole point of doing the practical parts of the training--as opposed to the social aspects--was to raise the productivity of the worker by enabling him to do the work better, in which case the training more than pays for itself; otherwise there is no reason for doing it. However, it was pointed out that, depending on the length of training, this return is delayed and the interim costs must be borne by someone.

Maintenance of Training Standards. Criteria to justify the remission of tax or granting of training subsidies to firms were discussed. It appeared that, in fact, in most countries there were no criteria that were being adequately administered; if a firm said it was training, it was assumed to be training adequately and the rebate was given.

Several criteria were suggested which might reasonably be applied. First, every trainee should be required to keep a workbook in which is set down, day-by-day or week-by-week, the actual work on which he was being employed, the kind of instruction he got, and some indication of how far he had progressed in that instruction. This is intended to insure that an employer does not keep a trainee too long on one job simply because he is proving productive in it, that he does in fact follow the curriculum and move the trainee from one type of production to another so as to give him a full range of experience. Lady Williams felt that this system has proved most effective in many countries. Dr. Skapski suggested that the workbook should include notations by the inspector on how well the work was done and should be admitted as one element in the external examination or other determination of competence.

A second suggestion was that the workbook--and indeed the whole of the training program--should be open to inspection from outside, with free right-of-entry at any reasonable time. Lady Williams stressed the importance of considering inspectors as consultants, rather than simply "snoopers." While an important part of their job is to check up on the quality of training and this could only be done by right-of-entry, it is equally important that they be considered as persons coming to give advice and assistance on the kind of training that is needed to help employers, particularly those who may be inexpert in conducting training programs.

A third criterion suggested was that there ought to be some kind of test of competence, either at the end of training or, preferably, at intervals during the training. This test must be given by someone from outside the employing organization, not by the employer. Only in this way is it possible to have a standard that can be universally recognized, and this is a prime requisite for mobility of workers from one firm to another.

Dr. Zaidi expressed the opinion that this test of competence should be tailored to the condition of the individual and that--in the case, for instance, of an illiterate carburetor expert--it could very well be done orally and by demonstration. Dr. Skapski made a case for the open book examination, inasmuch as the purpose is to train people to use their brains and whatever resources are available.

Lady Williams urged that the examination should be primarily one of practical competence, although she felt it important generally to have a small amount of theory to make sure the worker understands what he is doing, as well as being able to do it. She cited the Netherlands practice as being the best known to her. There the tests take place over a whole week to determine the sustainable skill level rather than what a trainee can nerve himself to do for a short period of time. These are primarily practical tests devised by managers and other people in industry with the help of labor organizations. The agreed exercises are changed constantly by people who know the industry, so that the test is in conformity with most recent technological advances rather than testing something done twenty years ago.

Where is Occupational Training to be Done?

It was generally agreed that cost-benefit analysis has not proceeded far enough anywhere in the world to give a very accurate picture of the real costs and returns from training in industry. Also, both Mr. Chan and Mr. Carvell expressed the conviction there are other determinants than economics which should play a role in determining where the burden of training cost is to be placed. Mr. Chan felt that placing the burden of training on the state as against putting it on industry must proceed in inverse ratio to the development of the industry in the particular developing economy in question. Mr. Carvell felt that even if training could be given less expensively outside the industrial firm (which seems unlikely), it is the ultimate degree of efficiency of the training that should be the determinant as to where it is to take place.

The Role of the Vocational High School

A subject of considerable debate was the role that the vocational high school could and should play in occupational training. Especially in developing countries where the supply of skilled workers is so small that training on the job is not an option, the vocational high school has loomed large. Mr. Quirolgico felt that its achievements should not be overlooked, particularly--as in the case of Taiwan for instance--where it has supplied workers with a certain amount of training when no other training opportunities existed. Particularly crucial for a newly developing country whose resources are limited is the question that faces any country: "What is the method that will supply well-trained workers most economically?"

Mr. Levine spoke of U.S. efforts, through A.I.D., to build vocational schools within the secondary school systems of various Latin American countries--a legacy of the U.S. Smith-Hughes Act. He felt that these efforts could be summed up as being somewhere between a failure and a miserable failure. On the other hand, the efforts of the UN Development Fund cooperating with the ILO in setting up independent OTO's (the national training services) with an assured source of funds has worked well in half a dozen Latin American countries and seems to be working better every year.

There appears to be very little data on training costs either in or out of industry, and much more cost-benefit research needs to be done.

However, Mr. Levine cited the case of Venezuela where the expenditures on INCE (its OTO) are roughly comparable to those of the vocational schools of the secondary school system. Although too little factual evidence exists to support an objective evaluation of the contribution of the two systems to the economic development of the country, he felt--unobjectively--that the balance was heavily in favor of INCE. There are obvious grounds for believing that a training system which utilizes equipment and instructors already in place can do the job more economically than a system which must undertake to assemble these facilities, as the school system must. In any event, Lady Williams pointed out, occupational training with its rapidly expanding and changing needs should not be in the position of having to compete with the regular school system for the very scarce educational funds in the general budget.

In France a strong belief that nothing could replace the classroom meant that the country traditionally looked for its skilled workers to come from the Ecole Professionelle in the secondary school system. However, with the rapid growth of industry and the skyrocketing demand for skilled workers, the French have found it necessary to institute extensive training programs in such employing organizations as Electricite de France, in the automotive industry, and in many other industries, so that now only about one-third of the skilled workers actually come from the school system.

Dr. Staley cited the study of the relative costs of educating students in a vocational high school in Worcester, Massachusetts, compared with the costs in a general high school in the same town (Corazzini 1966). The costs per student for the vocational high school were more than twice those of the general high school, while the starting wages of its graduates were on the average only about 5% above those received by the general high school graduates in the same industries, and there was evidence that the differential generally disappeared within five years.

Other studies have shown that disconcertingly large proportions of the graduates of vocational schools do not really go into the type of work for which they were supposedly trained. For example, a study covering 1953, 1958, and 1962 vocational graduates in the U.S. found that only 30% took their first jobs in the same trade for which they had received training, 18% in a highly related trade, 15% in a slightly related trade, and 37% in a completely unrelated trade (American Institutes for Research 1965:5-16). Furthermore, "the figures indicate that even those who start out in the trade studied in high school do not necessarily stay with the trade.[2] Six years after graduation, for example, only 14.4%

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[2] "The over-all conclusion is that the great majority of vocational course graduates do not work in the trade studied. Moreover, the majority

reported that they had held all of their full-time jobs in the trade studied. This sort of information must lead to serious questions about the wisdom of allocating educational funds to specific vocational training in the school system when the return to the community and the individual on the investment of these funds is of critical importance. Questions of cost and effectiveness in this field need careful attention.

Traditional Education Structure Too Rigid, Too Exclusive, Not Realistic

Lady Williams felt that the basic organizational structure of the school system, especially its system of tenure for teachers, is such that its personnel are almost certainly teaching about things which were current ten years ago, or more. Even where refresher courses are regularly required, teachers are not in a position to be intimately acquainted with the latest technology. Mr. Levine felt that vocational schools often do not only not teach what the worker needs to know, but may even teach methods and attitudes that must be unlearned before he can be effective in a job. In other words, while school teachers can and should introduce occupational understanding and teach about modern technology and its place in the country's development, it is questionable whether they should attempt to train for a specific task, as they will inevitably be out of date.

Mr. Levine saw the narrow-shaped pyramidal structure of the secondary school system of developing countries as another important reason for not placing occupational training activities in such a system, where students inclined toward manual trades have already been eliminated. The typical educational pyramid of the developing countries at the secondary level is by then composed almost exclusively of those pupils who have demonstrated their capability and interest in abstract ideas. To place vocational training of a manual sort in this structure is to give the training to the wrong people when those have already been thinned to only a fraction of the numbers actually needed.

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does not work in either the trade studied or highly related trades. Most jobs held are in a slightly related or completely unrelated trade, where relatedness is judged by the graduates. The conclusion is in contradiction to the findings generally reported by graduate follow-up studies. Perhaps that is because so few follow-up studies have been concerned with jobs beyond the first job after graduation." (American Institutes for Research 1965:9-35.)

It is impossible, of course, for a classroom to simulate the common employment elements such as punching the time clock, the nearby worker who may be "goofing off" or coming in five minutes late and throwing an extra burden of work on others, the actual or imagined display of favoritism, to say nothing of the necessity of working under pressure. Hence, actual work experience is an important element in realistic training.

Comprehensive vs. Specialized Secondary Schools

American educational philosophy has, of course, generally favored the "comprehensive" multi-channel secondary school. Here in the same school youngsters headed for early employment and those headed for the university have a common school experience in a core of general education and extracurricular activities in which all share. Gradually students are guided into "channels" or "streams" on the basis of demonstrated aptitudes, achievements, and interests. This has been favored because it appears to make the best use of human resources by encouraging the development of individual talent from whatever source. The "dual" system of education--in which children at an early age ("eleven plus") are steered into separate acedemically-oriented and vocationally-oriented schools--is felt to perpetuate class distinctions and inequalities of opportunity by restricting the rise of talented people from the lower strata and the fall of less talented ones from the higher strata. The "comprehensive" approach is thought, as well, to make the best use of educational resources by avoiding the fairly common situation where a vocational school is overstaffed and underoccupied while the academically-oriented school nearby may be understaffed and overcrowded.

Mr. Chan brought to the attention of the group the Australian system of bilateral schools: academic linked with commercial schools, or academic linked with technical schools, with bridges between them. He felt that this perhaps represented a good compromise between completely separate special schools and comprehensive schools which he felt were probably desirable but too expensive in the initial stages. In any case, establishment of the comprehensive school, before there is an adequate supply of the different categories of instructors required, hides the reality of the situation, which is that the school is and will for quite a while continue to be comprehensive only in form and not in substance. The focus should therefore be on a comprehensive system of education within the confines of the state rather than on comprehensive schools as such--at least in the early stages of economic growth. A comprehensive school system does not necessarily imply that every individual school should be comprehensive.

Dr. Skapski objected to categorizing comprehensive schools as too expensive. Although it may be correct that one school catering to academic, technical and vocational, and agricultural education is more expensive than one academic school, it is certainly not more expensive than three separate special schools with three principals, three libraries, etc. Mr. del Campo agreed and mentioned instances in Latin America where within 200 meters of a vocational school with very meager attendance there is a crowded general school with no laboratories or other necessary facilities.

Dr. Skapski pointed out that low population density may make it impossible to have even such limited comprehensive (bilateral) schools everywhere and that small schools must remain. But it is possible to have a comprehensive system whereby a boy from a small three-year post primary school may transfer without examination from one school to the other. It is the examination barrier that causes trouble.

Dr. Rao pointed out in a document (Rao 1962) distributed to Workshop participants that while the comprehensive high school might be an excellent form in the American educational technology, it seems to be more ideally suited for the highly-developed American industrial metropolis than for the village-dispersed populations of underdeveloped countries. The comprehensive high school also requires a sophisticated instructional organization and teaching force, and a leadership with a well-balanced philosophy of education. These are lacking at the present time in most developing countries. He felt that the area vocational school, on the other hand, lends itself to adaptation and application to meet the needs of developing areas. The area vocational-technical school can offer adult extension training as well as skill training for rural youth. Also it can emphasize specific skill needs of certain areas by operating only selected departments. Training in mechanical skills could be emphasized in area schools located close to mechanical industries; textile technology, in areas with textile industries; and fishery and shipbuilding, in coastal, fishing, and shipping areas. This form of school is, therefore, quite flexible.

Also interesting in this regard are Dr. Rao's comments, in another document (Rao, a) distributed to participants, on the Escuela Artes y Oficios--the Latin American version of the U.S. vocational high schools: "Unfortunately, these schools, particularly those in the public sector, enjoy only a second-class status in the educational system, attract only those that cannot qualify or afford to enter the academic schools, are staffed by poorly qualified part-time teachers and are housed in ill-equipped schools. The dropout rate in these schools is extremely high. In several countries, the curriculum of these schools is an imitation of the academic high school curriculum with a few shop courses added on. In effect, most of these schools are academic high schools in disguise. In their present physical state and outmoded curricula, the schools cannot be expected to supply the large number of skilled workers needed for industrial expansion."

Dr. Rao also speaks of the notable development of the national training services established outside the educational system, which unfortunately compete openly with vocational schools, duplicate facilities and programs, and tend to aggravate teacher shortages. In the long run, he feels, "public vocational training programs can compete with these programs only if they attempt a careful integration of general and vocational education and provide training programs more closely related to industrial needs.

"Any plan which brings the revitalized SENA type of programs into closer working relationship with efforts by educational groups and leads to shared facilities and staff would obviously help conserve funds and lead to articulation mutually beneficial to cooperating institutions. Teacher training programs conducted by the universities could use the shops and laboratories of these industrial apprenticeship programs and profit by the opportunity to develop useful relations with industry."

Dr. Rao then listed eight major impediments in the education and employment of technicians in Latin America:

1. Inadequate Supply of Secondary School Graduates: The high dropout rates in secondary academic and vocational high schools and the desire on the part of most secondary graduates to enter the university reduce the supply of students to enter technician training programs.

2. Prestige: Even if graduates of high schools are available, they seem to prefer the prestigious professions of law and medicine. Vocational and technical education is still for the other fellow's son. Even in the engineering fields, the technician programs are likely to be tried by those who fail engineering programs, although those that fail engineering programs seem to re-enroll in non-technical fields.

3. Poor Teaching Methods: Poor teaching methods--especially by part-time teachers of mathematics and science, and repetitive, obsolete shop and laboratory exercises--make technical training unexciting and encourage dropout or transfer to other programs.

4. Lack of Equipment and Textbooks: Vocational and technical education require great investment in shop and laboratory equipment, electric power, and shop supplies. Many countries find it difficult to make these large initial outlays and subsequently provide the large recurring operating budgets for technical programs. Particularly in the technical fields, the lack of text and reference books in Spanish and Portuguese is a serious impediment to effective instruction.

5. Poorly Prepared Teachers: The teachers of technicians must possess some of the technical knowledge of the engineer, some of the skills of the skilled worker, and the ability to present these to the students imaginatively. Even in the U.S., the preparation of teachers

of technicians has presented many challenges. Technician training programs in Latin America depend on part-time teachers or engineers who hold one or two other jobs.

6. Lack of Industrial Reasarch Activity: The lack of research in industry or applied research in the university is an impediment to the practical training or upgrading of engineering technicians.

7. Compensation and Incentives: The salaries of engineers and technicians are often less attractive than those of other graduates. The technician who is not included in the classification of "titular" engineer and not part of the negotiated wage structure of unionized workers might find that his job is a dead-end occupation.

8. Professional Accreditation: While engineers and architects have formed professional societies that accredit them, the technicians do not have such accrediting agencies. Even in the United States, the proper certification of technicians and the recognition of the certificates by industry is still in a confused state.

The Evolution of the Vocational High School

In the approach recommended by Dr. Staley in his Planning Document, the functions of the vocational secondary school would be divided between general, comprehensive secondary schools on the one hand and a new type of institution on the other. This new type of institution would operate in close cooperation with industry as an integral part of a combined system of training and further education, mainly for employed workers, and mainly financed by industry through an OTO or otherwise. It would serve: (1) youths in their first regular employment or with "sponsorship" of a potential employer, mostly on a part-time basis which would alternate instruction on the job with school instruction; and (2) adult workers, on a similar time-sharing basis, for upgrading, renewal, and transfer training and further education. School and in-plant training would be complementary, not substitutes for each other.

Meanwhile, where there is already a considerable investment in secondary vocational schools, the most promising avenues for development are likely to be the following three: (1) Affiliate some of the schools closely with industry, and use the equipment and instructors for those portions of a combined training and further-education program best carried on in an institution; in other words, create the new kind of institution mentioned above. (2) Convert some vocational schools into comprehensive secondary schools, using their equipment and instructors to constitute the industrial arts department of the comprehensive school. (3) Upgrade some vocational schools from the secondary to the post-secondary level and use them for technical training. There is a stronger case for institutional training of a specialized type at this level.

Special Institutions for Occupational Training and Retraining

Apart from the occupational training of new workers--whether it be in vocational schools or in industry--there is a need in every system for specialized institutions which are occupationally focused, serve a variety of functions at different levels, and can be entered either from school or from an occupation. Attention needs to be given this range of institutions to determine their importance to, and adequacy in, any particular economy.

Dr. Rao spoke of the whole series of interfacial activities and institutions which are involved in the process of getting a job, holding a job, and progressing in a job. These include guidance and counseling activities in an educational or training institution, programs of government and private employment services, training programs within industry, university extension courses, correspondence courses, national educational television courses, programs conducted by productivity centers, and programs conducted by organizations such as SENAI and SENA in Latin American countries. An inventory of these activities and programs in a country might reveal weaknesses that could be corrected by realistic planning.

Undoubtedly certain activities should be left to the long-term programs of the traditional educational structure. But in the interests of accelerated development, there are two areas in particular--lying at opposite ends of the occupational spectrum--that need special attention and perhaps special institutions outside the structure of formal education. On the one hand there are the marginal populations (these are found in highly developed, as well as less developed, countries) which must be brought into the work force and undoubtedly require specialized institutions. On the other hand, there is a great shortage in developing countries of the highly specialized worker needed in the new technology being imported into these countries. Several times in this context discussion turned to the problem of actually getting a flow of mid-level technicians from institutions designed to produce them. The strong desires of students and their parents to get the advantages in social status and income which they connect with higher education cause an unwillingness to aim at mere mid-level technical occupations.

Advancement and Retraining--For Adults Only

It appeared important to distinguish between adult education and adult training. Adult education--especially when called by that name and given in a formal school context--is often not very successful. However, the experience of a number of Workshop members (del Campo, Ennaceur, Skapski, Pinkau) showed that it succeeds very well as an adjunct of occupational training. Mrs. Pedraza had spoken of the successful educational program set up in Colombia for workers wishing to enter the SENA training program but who had just completed their elementary education. Mr. del Campo had previously mentioned the fact that theory which was normally rejected as a waste of time by adult workers attending night school for further training--or for retraining--was welcomed when it came as a part of a practical problem which they were attempting to solve.

Dr. Skapski had earlier spoken at some length of the experiences of upgrading small indigenous entrepreneurs and their apprentices (cabinetmakers, etc.) at the Vocational Improvement Centers set up as part of Nigeria's master plan for technical education. These centers, operating in Kaduna, Kano, Maiduguri, Jos, and Katsina (with more being planned) utilize facilities--both instructors and plant--of existing technical schools and any workshops operated by government corporations or provincial authorities. Their cost is relatively low--about forty pounds (equivalent to U.S. $112) per man-month of training. The trainees are recruited from the local market places, and many are practically illiterate. They have very little knowledge of even elementary science. For example, one freshly-enrolled trainee was asked, "What happens to the food when you have eaten it?" His answer was, "There is an angel in my stomach who takes care that the food would be used by my body."

The interesting fact is that, while originally these trainees were required to attend two nights of general education per week in order to take the training in cabinetmaking or whatever, it was soon found that the general education classes were bulging while the training attendance was lagging. So the requirements were reversed: those wishing to take the courses in general education were required to attend the training sessions.

Initially it was difficult to get these courses started, as the Kaduna Market entrepreneurs thought that the recruiter's questions about the number of their apprentices, etc., had to do with taxation. They would not even carry on a conversation. However, news of the first course (in cabinetmaking) spread rapidly, and there were more applicants than places available for the next course (auto repair and maintenance).

Lady Williams brought out a distinction made in the United Kingdom between occupational training meant to advance a worker in his occupation --which is usually felt to be the responsibility of the firm which employs him--and the training given a worker whose field of activity has become obsolete and who is obliged to learn a new occupation. This is considered to be a public responsibility and is discharged through a large number of government training centers for full-time instruction, with a maintenance allowance provided to the trainee. The need for this type of retraining has become so great with the rapid advance of technology that firms are being encouraged to start their own retraining centers, the cost of which will be underwritten by the government.

Bridging Institutions

Mr. Levine spoke of the infinitely complex task that faces many developing countries, more than 95% of whose population has little if any education. He is much impressed with the nonformal training institutions which are able to teach the adult sectors of this population the "three r's" in a much shorter time and at a much cheaper cost than the formal education institutions, because the teaching is done in the context of a specific occupational goal and benefits from the vastly increased motivation.

Mrs. Sutherland emphasized the fact that many specialized institutions focused on occupational training must be prepared to back up and undertake a compressed version of general and pre-occupational education, sometimes to the extent of teaching basic communication in a language which may be new to the trainee. And rarely is there as much time as two years for this task.

Mr. Abronski spoke of his work with marginal populations at the Camp Rodman Job Corps Center, a part of the U.S. War on Poverty program. The primary task is that of preparing young adults for job entry through courses in one of three categories: machine operator training, process training, and clerical training. However, due to the fact that these young people are educational dropouts from marginal social groups with a high incidence of broken homes, low incomes, and disrupting emotional problems, it is necessary also to bring their general education up to par. Many of them are functional illiterates. Even more critical, perhaps, is the necessity to give them the pre-occupational education they lack through 24-hour-a-day counseling, thus attempting to create in them the desire to learn and to hold a job. It is even necessary to teach then how to conform to the demands of white collar society (or even blue collar) which generally requires reporting to the job on time, five days a week, and staying for 8 hours a day. These young people live at the Center for periods up to two years, so there is an opportunity for full-time counseling.

Resource Allocation

The field of adult occupational training, including the necessary further education, is one which should receive higher priority, in Dr. Staley's opinion, than is usually given to it when allocation of educational funds is being made. It offers an important possibility for more quickly increasing the productivity of a country and rapidly advancing its development. The benefit-cost ratio for funds spent on adults whose additional training can lead to an immediate productivity increase is likely to be higher than that for funds spent on children who will become producers only years later. Mr. Nikom heartily seconded this position. Thailand has been very proud of its high literacy rate, stemming from a forty-year history of compulsory education through the fourth grade (now being raised to the seventh grade); however, in actual fact, very few of these people can read, or even write their signature.

Mr. Nikom favored an emphasis over the next ten years on adult education of people already employed, whose further training would make them quickly more productive, rather than more general education for that sector of the population which will remain in the village and quickly forget what they have learned through lack of use. At the outset of the Workshop Mr. Nikom had asked for help in finding ways to bridge the gap in newly developing areas between urban and rural populations: how to view the approaching expenditure in Thailand of $50 million on expanding vocational education which affects only 30,000 persons, in contrast to the five million persons in rural areas.

One possible way out of the dilemma over use of funds for adult or child education perhaps exists in the idea of the community school. This is a school which serves both children and adults and relates its curriculum to developmental needs, especially those of the local area. The community school, though an attractive concept, seems to have met with very spotty success where it has been tried, in the Philippines among other places. It would be interesting, Dr. Staley thought, to attempt to find out why it has worked well in some places and not at all in other places. One successful effort in the Philippines persuaded adult (farmers) to adopt new farming practices taught in the school's agricultural program, and the increased flow of income from these improved techniques was used to pay for the children's education.

However, it was emphatically agreed that it is not really possible to make an "either-or" choice between adult and child education. Developing countries must continue to expand general education for everyone as much as possible, but the field of adult occupational training must also receive more attention than it has been getting.

The Training Officer

The importance of the training officer was stressed by Lady Williams. He is the person in a firm who identifies training needs and develops programs to meet them, as differentiated from an instructor who actually gives training. It is he who must establish the priorities of those training needs and who must recognize the way in which training is related to the final product: not the trainee in this case, but the final product the enterprise is geared to produce. The training officer must consider what kinds of training are needed for the different people who between them cooperate to turn out that final product.

It is essential that the training officer be a member of the management team. He must be fully cognizant of the firm's whole range of current training needs and also of the direction in which the industry and the firm is headed, so he may know something of future requirements and be able to make advance training plans. Lady Williams voiced an interest in knowing what people would propose as the proper preparation and training of the training officer himself. Mr. Abronski described IBM's technique for training officers as one which relied largely on knowledge gained through trial and error in the experience of coming up through the ranks.

Recently a month's training seminar was organized in Chile by CINTERFOR, which serves as a clearing house for the occupational training organizations of Latin American countries. The purpose of the seminar, described by Mr. del Campo, was to study the problems of in-plant training, including the training of training officers.

Member country organizations have developed schemes most of which distinguish three main levels of personnel in industry responsible for carrying out training programs: (1) the Chief of Training within the firm, usually a man at management level with basic engineering background; (2) the man in charge of training and the study of training needs within the industry; and (3) the instructors. These studies have developed a methodology for analyzing what problems in an industry stem from training difficulties as distinguished from organizational, engineering, or economic problems.

Dr. Staley spoke of SENATI's program in Peru, which prepares training officers and lends them to firms for the purpose of establishing training units. The head of SENATI, Dr. Romero, says that he privately hopes that these officers will prove so useful that the firms will decide to retain their services on a permanent basis. In such cases SENATI gladly trains additional training officers and thus keeps them moving into industry.

Mr. del Campo pointed out that training officers are to be found mostly in larger firms with 200 employees or more. Where smaller firms have organized themselves in some way, it is possible to have one training officer for a group of firms. Mr. Araujo spoke of the special difficulties of the smaller type of firm in Brazil and of SENAI's efforts to meet these problems, as described in a document available at the conference (Araujo 1966).

Teacher Training and Retraining

Mr. Podesta brought up the subject of teacher training, observing that the type of institution selected for occupational education and training will have implications for teacher supply as well as teacher selection, training, and retraining. Several elements which bear on the effectiveness of teachers were discussed.

Dr. Frank had observed earlier that at least as much attention must be given to recasting the teacher's college teacher as to any other aspect of occupational education. Mr. del Campo said that schools of education in Latin America were so poorly equipped to produce teachers for occupational training and the mentality of the whole system was so bad for teachers who would be working with adults that INACAP prefers to recruit its instructors from among persons who have had no previous teacher training. In fact, in most countries where there is an OTO it has been necessary to start separate programs of what they call "instructor training."

Dr. Pinkau spoke of the practice in Iran--and Mr. Ennaceur in Tunisia--of recruiting practicing or professional persons directly from the field of work in which training is to be given and then giving these persons special, short courses in teaching methods, rather than attempting to use persons trained originally as teachers. UNESCO is using this technique for a literacy program in occupational fields with much success, as there appears to be good communication and information transfer.

Mr. Araujo felt that more adequate wage incentives for teachers of occupational subjects were badly needed. Mr. Levine observed that it was necessary to recognize that even with a perfect incentive system, an ideal wage scale, and regardless of the training given, the majority of teachers will fall in the less-than-ideal category. Therefore, a real problem is how to design a more efficient educational and training system which recognizes this and compensates for it: to devise "teacherless" or "teacher-proof" curricula where possible and use the best teachers for those areas where this is not possible.

Mr. Carvell commented that training institutions must use new instructional technology for certain parts of their curriculum and thus relieve the teacher from burdensome repetitive tasks. Dr. Staley referred to the potentialities of television, whereby master teachers, who would be given the time and research assistance to develop the best teaching methods, could be viewed with great benefit not only by students but also by teachers, who would be upgraded right in their own classrooms.

Dr. Brunner spoke of the advantages of team teaching. The team approach enables each individual to establish a meaningful context for his particular piece of subject matter. Each teacher has his own academic specialty; he also has his own particular pattern of socialization. One teacher can establish an individualized relationship with a student that the others may not be able to achieve. Thus from the wider variety of knowledge and personalities available, the individual student is more likely to find that which speaks to his own condition. Finally, as a group, the teachers are much more able to correctly evaluate the effectiveness of the learning which has taken place.

Lady Williams made the point that under certain conditions, where the subject can be broken up into its constituent elements and the pupil allowed to progress at his own speed--as in languages and many technical processes--it would be possible to produce a teacher-proof curriculum. However, when the subject being taught involves judgment or some other qualitative element, and especially for the real job of education which is to teach people to question and think for themselves, there is no substitute for a face-to-face relationship. Dr. Skapski pointed out that while some people feel that programmed learning can be manipulated in such a way as to help the student learn to form judgments, there is still that one vital element no machine can implant in a pupil--inspiration.

The importance of career-long further training and retraining of teachers--as well as others--was stressed. This not only up-dates their knowledge and methodology, but also reminds them how it feels to be a student. Dr. Frank stressed the importance of having a flow of village teachers back to the university on a regular basis. Dr. Staley brought up the idea of having an expiry date attached to a degree, which would then have to be renewed periodically. Dr. Hanf stated that, in fact, a French doctorate in atomic energy does have a five-year expiry date.

New Types of Institutions Needed

Lady Williams cited the evident need for new and different kinds of educational and training institutions--not part of the formal educational system nor part of the usual pattern of in-service training plus further education which falls in Planning Model Phases 3 and 4. There exists in various parts of the world a variety of institutions which fit different kinds of cultures, but which could be considered with benefit by all.

Dr. Staley felt there would be great value in seeking examples around the world of institutions which have functioned in certain novel ways and making case studies of them. It would probably be well to limit this inquiry to institutions which have close connections both with the employment system and with the educational system: for example, the Vocational Improvement Center at Kaduna in Nigeria with which Dr. Skapski has been connected. Here an institution that was formerly in the education system is now in both systems, and the facilities, the capital equipment, and the instructors are being used much more efficiently than formerly, both day and night. Perhaps such an inquiry would show how this interrelationship--this bridging process--has been achieved. Such a study should probably investigate failures, as well as successes, to learn the reasons for each.

As Dr. Allee pointed out, it is important to realize that some programs succeed because of special circumstances which could not be reproduced: for example, a program dependent on a large amount of outside money, or on a rare type of individual who could make even the worst kind of system succeed.

B. Related Workshop Papers

THE INSTITUTIONAL CHOICE FOR VOCATIONAL TRAINING IN LATIN AMERICA

by

Joshua M. Levine[1]

Everyone agrees that a skilled labor force is essential to development, but few agree on how best to develop the necessary skill, or on which is the best institution for doing so. After almost two decades of technical assistance devoted to this problem, which has been variously approached but not always successfully resolved, the battle still rages. The purpose of this paper is to discuss, in the context of Latin America, the question, "Which Institution?"

If one examines external assistance attempts to develop vocational training systems in Latin America, two broad patterns emerge. One is the bilateral program of the Agency for International Development (AID) and its predecessors, the other the multilateral efforts of the International Labor Office (ILO).

A study (U.S./HEW:1953) of the joint efforts of the U.S. Office of Education, the Pan American Union, and the Institute of Inter-American Affairs (AID's then predecessor), showed extensive AID assistance projects for vocational education in Bolivia, Brazil, Chile, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay, and Peru. In each country one or more technicians in vocational trade and industrial education had been assigned, and in most vocational school construction was also under way. In Nicaragua, for example, a vocational institution was under construction with provision for training in eight occupations, with 15 to 20 students in each shop. In Paraguay, teachers were being sent abroad for study as early as 1947, and a sizable investment in the form of technician teams and school construction began a few years later. It continued with several technicians for more than 10 years, and U.S. support for the Escuela Tecnica Vocacional has been withdrawn only within the past year or two.

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The cycle of experience with these efforts can be observed in almost any Latin American country and is almost universally the same: a heavy U.S. investment of technicians and funds was initially effective but deteriorated substantially when AID support was ultimately withdrawn. In Nicaragua, for example, the potential annual number of "graduates," given existing space and equipment and a full teaching staff, is about 160; the number who "graduated" in 1966, more than 10 years after the school started, was 60. In Paraguay, on the same basis and after about the same period, the number of graduates could be upwards of 120, but it has never been higher than 67, and the numbers both of instructors and entering candidates are on the decline. After the substantial initial efforts of both AID and the national government, the continuing effort cost Paraguay about 5% of its annual budget for education and about 50% of its secondary school budget. It is revealing to compare the vocational school output of 67 or so with the general secondary output of about 2,500.

The usual AID pattern in these attempts was to develop, under the supervision of the existing Ministry of Education, a vocational school system patterned after those common in the United States. (A much rarer attempt has been to build apprenticeship programs within Ministries of Labor.) Here is a classic example of an institution deliberately copied from one culture without a full examination of its function in another.

If the basic institutional form being copied was the vocational school within the formal school system, what was the substance of the experience with this form within the U.S. itself? A recent study (U.S./OL:1964) has shown that on-the-job training was reported as the chief source of training for 66% of adult workers age 22 to 64 who had completed less than three years of college. Less than 30% of those interviewed said they had learned their job through formal training, which included, in addition to vocational schools, the apprenticeship system and military service. A related study showed that for the years 1953, 1958, and 1962 only 13.4, 14.4, and 19.8% of the trade and industry graduates had held all of their full-time jobs in the trade studied. Moreover, a related study (Eninger 1965:Ch. 5, p. 25) has shown that the majority of vocational course graduates do not enter the trade for which they were trained in high school.

A different pattern of skill development in Latin America is the emergence of national manpower training institutions, established largely with International Labor Office (ILO) technical and financial assistance, in which European experience predominated. These now exist, at various stages of development, in Argentina, Brazil, Chile, Colombia, Peru, Venezuela, Mexico, and Costa Rica. They share these most common but not universal characteristics: (a) they are financially supported by a payroll tax, usually 1%, (b) they are independent of either the Ministry of Education or the Ministry of Labor, but have representatives from both on a tripartite governing board, on which labor and industry are also represented, (c) their actual operation is supervised by a Director, who is himself only nominally supervised by the Board, (d) they are dedicated to a highly flexible approach to training needs, and (e) they are also responsible for upgrading the skill of the already employed.

The following brief table summarizes the salient features of the major examples of these institutions in Latin America.

Latin America Manpower Training Institutions

Country	Name of Institution	Year of Origin	Financial Base	Recent Year Output (Approx.)
Argentina	CONET	1959	1% of payroll	100,000
Brazil	SENAI	1942	1% of payroll	45,000
Chile	INACAP	1960	Annual appropriation	12,000
Colombia	SENA	1957	2% of payroll	17,500
Peru	SENATI	1962	1% of payroll	N.A.
Venezuela	INCE	1960	*1% of payroll	50,000

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*Also, 20% from Government appropriation and a token tax on workers.

Far too little is known, and even less is documented, concerning these major training agencies. Even broad coverage, however, would not easily describe the sense of vitality and purpose which pervades them. Their leadership is characteristically young, dynamic, and innovational. Errors have been made, and the tasks of more training, better training, and more efficient training are still formidable, but the prognosis is clearly positive. Colombia's SENA recently was able to legislate a doubling of its income, from the 1% legislated in 1957 to the 2% legislated in 1965. Venezuela's INCE, only five years after its birth, overachieved its goal of 50,000 trainees per year in 1965. The contrast with the efforts of formal vocational school systems is unavoidable. In confronting the latter, Harbison and Myers, in Education, Manpower and Economic Growth: Strategies of Human Resource Development, argued that "in many cases the vocational schools are little more than high-cost producers of nontechnical manpower, whose rather dubious contribution is to give a poor general education to students unable to get a better one in the secondary schools." Elsewhere they conclude "skill development is best performed outside the formal school system."

Developments in Latin America certainly seem to confirm the Harbison-Myers judgment in the matter of vocational training, as it has in many other areas. Their acuity and wit, however, permits them to omit mention of the several fundamental reasons why the formal school systems are the wrong place for vocational training. Nor do they embrace an alternate institutional choice. What are the reasons, and can they help us make the choice?

Flexibility. The nature of industrial development is that it puts changing demands on job content; it is both difficult and expensive to change job training to meet these changing demands, particularly for a Ministry of Education. Education perpetuates tradition; it does not change it. The school systems of Latin America have long been concerned with a heritage of education for an intellectual elite, and they move away from it only slowly and with difficulty. The concern for a modern, flexible labor force is very much a late-comer, and not yet fully welcome, let alone understood. Implementing such a concern requires a high degree of flexibility, which is still farther from the interests, the tradition, and even the purposes of most education ministries.

The training institution has no such problem. Since its only purpose is to meet industrial, commercial, or agricultural demands for skilled labor, it finds it no real problem to change methods of instruction and course content as the changing needs of the industry or the job demand. If some jobs require only two weeks of lectures or demonstrations, that is the response given by the training agency. If some jobs require a three-year sandwich of job experience and classroom work, that is the response of the training agency. If some industrial training needs can be met by training men who will work as the employer's own training coordinator, the agency can so respond. And if last year's need for diesel engine mechanics is replaced by this year's need for draftsmen, the training agency is able to stop one course and begin the other. Changing labor force needs can be met only by a flexible supplier of skills.

Costs and Efficiency. Vocational education is costly. A Minister of Education, faced with overwhelming demands and limited funds for schools, for teachers, for instructional materials, and for dozens of other needs, must inevitably make difficult choices on how he spends his too-thin budget. The cost per student of vocational training in the secondary school system has been variously estimated at as much as 3 to 5 times that of academic education. It is a factor the Minister cannot ignore. The all-too-frequent and understandable outcome is that he cuts expenses for vocational education. The net result of this is that instructor salaries are reduced below the level necessary to compete with industry, the equipment necessary to keep current with industrial development is not bought, and the instructional material vital to vocational training becomes unavailable. And the ultimate result is that poor instruction makes a poor trainee, who is repeatedly rejected by the industrial employer. Perhaps even worse, the diversion from the general education system of whatever funds are spent on vocational education frequently means that the general education result is not what it should be, either.

By contrast, the quasi-autonomous training institution, with an assured source of funds, can successfully compete for teachers and can readily equate its equipment and instructional materials with those of industry. In reality, much of the instruction is done in such close relation to work itself that the classroom instructor is often also the workshop supervisor. Moreover, the training agencies concentrate on training in the context of an existing employer-employee relationship. This reduces to the effective minimum the kind of loss involved when a trainee does not work at the job for which he trained. The 13-20% use figure shown for the U.S. is probably not too far from that in Latin America, although little factual data is available. In the U.S., the implied 80-87% loss can be chalked up to "curriculum enrichment"; in Latin America such a loss factor simply cannot be afforded.

Market Factors. Institutional choice is very much affected by the fact that vocational training has a market value, in that the increased productivity of the trained worker more than offsets the cost of the training. But the training does have a cost, and it must be borne by some element of the society. The economic principle that "the user should pay" is relevant here. In one sense, of course, the worker, the employer, and the general public all profit from the training and all are therefore "users." The principle behind the payroll tax for training is that the employer is the most direct user, in that he is the one who first profits from the training. In addition to the principle, a very practical value exists in the earmarked tax, and that it permits the payer to check more easily on the effectiveness of its use and thus helps to insure the continued value of the training product.

A possible corollary is that the purpose of vocational training is to prepare the individual for work, while the purpose of education is to prepare the individual for many roles in addition to that of work alone. In relation to general education, the general treasury (into which all, including the worker, pay) is a fair source of funds; in relation to training for work, the more limited purpose suggests a more limited source of funds. The proof of the principle would seem to lie in the success of the payroll-tax-supported training institutions.

The institutional choice for vocational training is vitally affected by still another market factor, i.e., the profound operating difference between the theoretical need for vocational school output and the reality of effective demand. The fact is that need for skilled workers in most Latin American countries vastly out-distances effective demand. In Paraguay, for example, with 400,000 workers in the agricultural labor force, there is a probable need for a bare minimum of 1% (or 4,000) trained and educated agronomists and veterinarians. Despite this, the only school producing such professionals plans to level off at about 40 per year on the grounds that, as a matter of practical fact, not more than this number annually can probably be placed in related professional occupations. In the middle-level skill area, the same factors exist: productivity could be sharply enhanced by the use of skilled workers and training programs, but few among the employing establishments act on this policy.

Generally, only anecdotal evidence is available to support this argument for Latin America, but some figures do exist to demonstrate a comparable attitude in the United States. A survey (NICB 1964) of 426 manufacturing companies found that while 45% conducted formal training programs for employees, 83% of the companies of over 5,000 employees had formal training programs, but only 30% of the companies with less than 5,000 employees had such programs. Given the difference between personnel and management practices in the United States and those in Latin America, the problem of acquainting the Latin American employer with the value of training is a serious one. Unless it is done, however, it is virtually impossible to close the gap between effective demand for training and theoretical needs for training.

Ministries of Education are simply not capable of dealing directly with this problem, nor, given the massive general education tasks which confront them, should they be burdened with it. On the other hand, an institution designed specifically for vocational training purposes, with funds, staff, program, and facilities for doing so, finds this problem at the heart of its existence. It can and does find effective devices for educating the employer to the values and uses of vocational training, or it ceases to exist.

Product Differences. Vocational school graduates are less than enthusiastically welcomed by industry. This is true even when instruction is of high quality. The reasons for this are complex, but perhaps the most common thread is that the student regards himself as an "educated man." In effect he has been educated out of context, not trained in the realities of the world of work. As an "educated," and thus "superior" man, he demands a supervisory or other position above the level of the workers already employed. Even if the employer accepts this assumption, the ex-student's fellow workers do not. The ex-student demands the higher wages that his superior training have presumably entitled him to, and is disgruntled and unwilling to work properly unless he gets them. Moreover, the student frequently finds himself in work either much more limited than the range of tasks to which he has been exposed in schools, or largely unrelated to his training. In sum, the employer who hires the ex-student hires a pay, personnel, and productivity problem; the employer who does not, loses a high-potential worker.

On the other hand, the autonomous training institution concentrates on training within the context of the work situation. It does this by upgrading the skill of those already employed or by training new workers through apprenticeship, where an employer-employee relation already exists, or by training work supervisors to do their training. In either case, it creates no false hopes on the part of the trainees and trains only in relation to the actual work to be done.

Finally, vocational schools in Latin America train the wrong students. This is simply the inevitable by-product of the nature of the educational pyramid in most Latin American countries. At the secondary school level, where most vocational education is provided, the pyramid is so narrow that the vast bulk of the potential industrial labor force has already left the system. Moreover, the education system is so impoverished in teacher quality and in instructional materials that the student who survives the primary school is quite likely to be the student who is responsive to academic or intellectual rather than manual interests. Unfortunately, the system forces him to make a choice far too early for him to know whether he wants or is suited for accountancy or foundry work, and the system, devoid of counseling or testing techniques, gives him no help whatsoever in making his choice. Ironically, those reaching the secondary level are still numerically insufficient to meet the needs of the labor force for professional, technical, administrative, and clerical workers who are interested in and should have general or academic education for their world of work. Yet the vocational schools drain off a portion of this already insufficient group in the attempt to train for occupations in which these students are not fundamentally interested nor aptitudinally inclined. There is considerable evidence that a very large number of these students enroll in vocational schools simply because places are not available in general education. This suggests that the formal school systems must considerably increase the opportunities for general education before they can attack the much more specific and more expensive tasks involved in vocational training.

Be it said, despite the decided point of view expressed in the foregoing, that both the general failure of the formal school approach and the general success of the quasi-autonomous agency approach need to be qualified. In some communities, a happy combination of high-quality technical assistance and a dedicated local national school director and staff have merged to make the vocational school a success, at least for a few years. But these are events which could not outlast the negative effects of the system itself. On the other side of the coin, the training agencies have not always used their funds, their flexibility, and their autonomy to the maximum. One of their most serious operating weaknesses is the inadequacy of their attempts to measure the kinds and quantities of training needed. Another is the general failure to evaluate results, a failure which, if allowed to continue, can bring them to the same moribund, ineffective condition as the formal school systems. The importance of their mission and the size of the funds administered make the use of modern management practices indispensable, but these practices are not yet in common usage among them.

The fact that an occasional vocational school has temporarily succeeded and that the training agencies have defects does not, however, seriously modify the institutional choice. The course for the development planner seems clear: the formal school system for the task of general education; the quasi-autonomous training agency for specific occupational training. No institution other than the school can take on the job of general education, but there are many other choices for skill development.

There are many and important ways in which the two institutions can complement each other. Perhaps the most important of these is in the exchange of occupational information. Facts about employment, jobs, job content, wages, job prospects, all are necessary for the proper planning of vocational training. The training agency must collect such information continuously and in detail in order to fulfill its mission. The student also needs this information, but only some of it, to adequately plan his education and work career. What better vehicle for getting the right information to him than the school system? By helping the student, through job information, to determine which is his best economic role, without attempting to impart the skill itself, the school stays closest to its basic function of general education.

Meanwhile, past investments in vocational education within the formal school system need not be regarded as total losses. The potential additional classroom space represented by the vocational schools is needed by every Latin American secondary school system; equipment can be readily absorbed by the national teaching agencies, or used in place; instructors can be alternatively absorbed by either institution, depending on individual background, capacity, and interest. Perhaps most important, funds used to maintain the vocational education programs can be transferred to help meet more adequately the overwhelming financial needs of general education systems.

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EDUCATIONAL AND VOCATIONAL GUIDANCE IN SINGAPORE

by

H. Keng-Howe Chan[1]

Introduction

Singapore has a population of 1.9 million on a land area of 224 square miles. Of the total population, more than half are under 21 and almost 30 percent are in schools. Within the Republic's broad educational structure, every child is entitled to six years' free primary education in the language medium of instruction of his parent's choice. Universal free primary education has been achieved in Singapore without making it compulsory. In education-conscious Singapore almost 99 percent of the school-age group of the population are in schools. A peculiar feature in Singapore's educational system lies in the fact that there are four languages of instruction, and while nearly two-thirds of the school population are in English medium schools, about 30 percent are in Chinese medium schools, and the rest in Malay medium schools and Tamil medium schools. Again a distinctive feature of Singapore's educational structure is the integrated school where pupils of two or three language streams study in one building under a single administration.

After six years primary education, a child can proceed to secondary school for four years in either the academic stream or the technical stream, or, if he is not successful in the primary school leaving examination and is over the age for retention, he can go to a secondary vocational school for two years' training where he is taught the rudiments of a trade as well as given some general education. Those who complete four years secondary education and obtain the School Certificate with sufficient merit can proceed to two-year pre-university courses to qualify for the Higher School Certificate, which is the minimum entry qualification for admission to the University of Singapore.

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[1] Secretary, Public Service Commission, Government of Singapore; Chairman, Vocational Guidance Steering Committee.

Table A

Higher Education Enrollment for Academic Year 1967/68

University of Singapore	3,305
Nanyang University	1,750
Singapore Polytechnic	2,963
Ngee Ann College	401
Teachers' Training College	4,814
TOTAL	13,233

Table B

School Enrollment in Singapore - 1967

	Total	Male
Pre-Universities I & II	7,600	4,654
Academic (Secondary I, II, III & IV)	118,690	59,282
Technical (Secondary I, II, III & IV)	8,241	7,822
Secondary Vocational I & II	10,051	7,272
Singapore Vocational Institute	1,764	n.a.
Primary Education	371,035	199,141
Pre-Primary Education	4,825	2,572
TOTAL	522,206	

Need for Vocational Guidance

The decision to initiate a program of vocational guidance was made after due consideration of the immense technological and industrial changes taking place in Singapore. Every year some 18,000 pupils leave school after completing the school leaving examinations and the majority of these immediately enter the labor market. The variety of jobs available is extremely confusing to the young school-leaver. Without any specially developed talent or interest, he would find himself looking for a job in the face of severe competition prevailing in Singapore. There are, on the other hand, quite a variety of positions available in specialized occupations, but these youngsters are often unaware of them, or, if aware, have not had the necessary job preparation for such occupations. They tend then to take the line of least resistance, often following a well-beaten path. With so many youngsters competing for the same jobs, it is unfortunate that many of them would not land in any worthwhile occupation for quite a long while. Unless steps are taken initially to prepare the young school-leaver, he may find himself eventually in a hopeless rut or blind alley doing work unrelated to his aptitudes or inclination.

The trading sector of the economy with its requirement of white-collar workers does not provide sufficient jobs for the input into the labor market, while on the other hand many young people are reluctant to take on blue-collar jobs in the industrialized sector because of inadequate preparation, ignorance, and the traditional preference for white-collar work. There is therefore an acute need for vocational guidance to assist the young people to adapt themselves to a society which demands higher standards of competence and skill.

Vocational Guidance Steering Committee

In April 1964, a committee known as the Vocational Guidance Steering Committee was formed to initiate, direct, and co-ordinate efforts of vocational guidance in Singapore. Its members were drawn from representatives of various governmental departments, including the Public Service Commission (which is responsible for a large portion of the recruitment of personnel in the public sector), the Education Ministry, and the Labor Ministry. The Steering Committee's first task was a psychological one, that is, to stimulate an attitude for guidance in the community as a whole, particularly with respect to the parents who still have a strong influence on the career choice made by their children at the time of leaving school. Various activities were organized with this aim in view. In general, the emphasis was on the provision of occupational information in diversity and in detail, but with particular reference to work in the industrial sector requiring various practical skills. Talks and printed information on the guidance programs of other communities or countries were presented to the community. Mass publicity media including TV, radio, and the press, as well as poster campaigns, were mobilized in this task.

In addition, a network of career masters and career mistresses in all secondary schools was instituted under the leadership of the Vocational Guidance Unit, which was simultaneously set up in the Ministry of Education with a professionally trained Vocational Guidance Officer as its head. Printed occupational information was issued to all schools through this network of career masters/mistresses, and they were also given ad hoc briefings which emphasized particular community needs and the build-up of occupational literature in all secondary schools. They were also assisted in visiting training institutions and other places of vocational interest, while the school children were at the same time provided job-exploratory experience or lectures on careers often with the assistance of voluntary agencies such as the Junion Chamber, the Rotary

Club, and the Lion's Club. A Careers Exhibition and an Arts, Crafts, and Hobbies Exhibition, aimed again at stimulating community interest in vocational guidance and in providing job information to all school-leavers in a more graphic and concrete setting, was the climax to the Committee's activities at the end of its first year of work. This pattern and pace of work of the Committee has continued and developed since then.

Vocational Guidance in Schools

(1) Career Masters/Mistresses

Vocational guidance services in the schools are specially planned as a continuous process linked with learning activities in the classroom and extramural activities. Vocational guidance in schools is the responsibility of the Head of the Vocational Guidance Unit which coordinates and directs the work of the various career masters/mistresses of schools. These career masters/mistresses are full-time teachers who are given additional responsibility for career guidance including:

(a) maintaining the careers' section of the school library and seeing that it is properly used;

(b) keeping pupils informed on career opportunities and trends; and

(c) initiating and coordinating all career work within schools.

If they are given adequate professional preparation and their teaching load is commensurately reduced, they ought also to cover the following duties:

(d) counseling pupils and helping them to discover their vocational and educational possibilities and to formulate vocational and educational plans;

(e) obtaining full information about the attainments, abilities, interests, and personal background of pupils; and

(f) maintaining a liaison with the Youth Employment Service in order to help pupils obtain employment assistance.

(2) Vocational Guidance Unit

The aims of the Vocational Guidance Unit in the Ministry of Education are given as:

(a) To organize a program of guidance services for the Singapore schools including:

    (1) Test information - Advising principals and teachers on the use of the various types of tests--mental ability, achievement, aptitude, interest inventories, and personality rating scales;

    (2) Test construction - Collaborating with suitable individuals and institutions in the construction of tests suitable for use in Singapore;

    (3) Occupational information - Assisting in making available to principals and school officials occupational monographs, pamphlets, films, etc.

(b) To organize and conduct pre-service and in-service courses for teachers in Guidance.

(c) To assist teachers in the following Guidance fields:

    (1) Administering tests and interpreting test results,

    (2) Counseling methods and techniques,

    (3) Developing and maintaining cumulative records of the pupils,

    (4) Organizing and conducting occupational information classes, and

    (5) Planning and organizing "Career Exhibitions."

(d) To cooperate with the other Supervisors and with the relevant advisory councils as well as the Ministry of Labor in the selection, placement, and follow-up activities of students.

(e) To cooperate with the relevant section of the Ministry of Labor in a program of occupational research.

The Cumulative Record Card has already been introduced, but careful supervision needs to be exercised in order that it is utilized properly and in the correct perspective. This should not be just "another job" thrust on the teacher but the responsibility of specially trained guidance personnel.

In testing, group tests should be introduced for use on a large scale in screening school populations, while individual tests should be constructed for problem or special cases. The former could be the responsibility of the Vocational Guidance Unit or the Examinations Division of the Education Ministry, while the latter could be that of the Child Guidance Clinics or a school's psychological service. This implies adequate staffing in both cases. Considerable research and experimentation should precede full-scale implementation, since standardized tests require adaptation or reconstruction to suit local conditions (particularly as they reflect differences in culture) and local norms must be established. Both tests which help to predict future success of pupils (prognostic) and tests which identify pupils' difficulties and help towards their remedy (diagnostic) must be developed.

The intensification of the vocational guidance program is found in Secondary III and IV. The field of educational guidance needs to be further refined in order to be more effective in its role to complement vocational guidance. In particular, the setting up of Child Guidance Clinics should be a matter of high priority. In the case of career masters and career mistresses, one of the big problems confronting them is adequate preparation. Each year at least one course is organized and conducted by the Vocational Guidance Unit to provide such needed training, and in this task the Vocational Guidance Officer is assisted by experts sent here from other countries to lecture in our Teachers Training College on such fields as Educational Psychology and also by specialists in this field in the foreign schools in Singapore which have full-fledged counseling units.

Labor Ministry

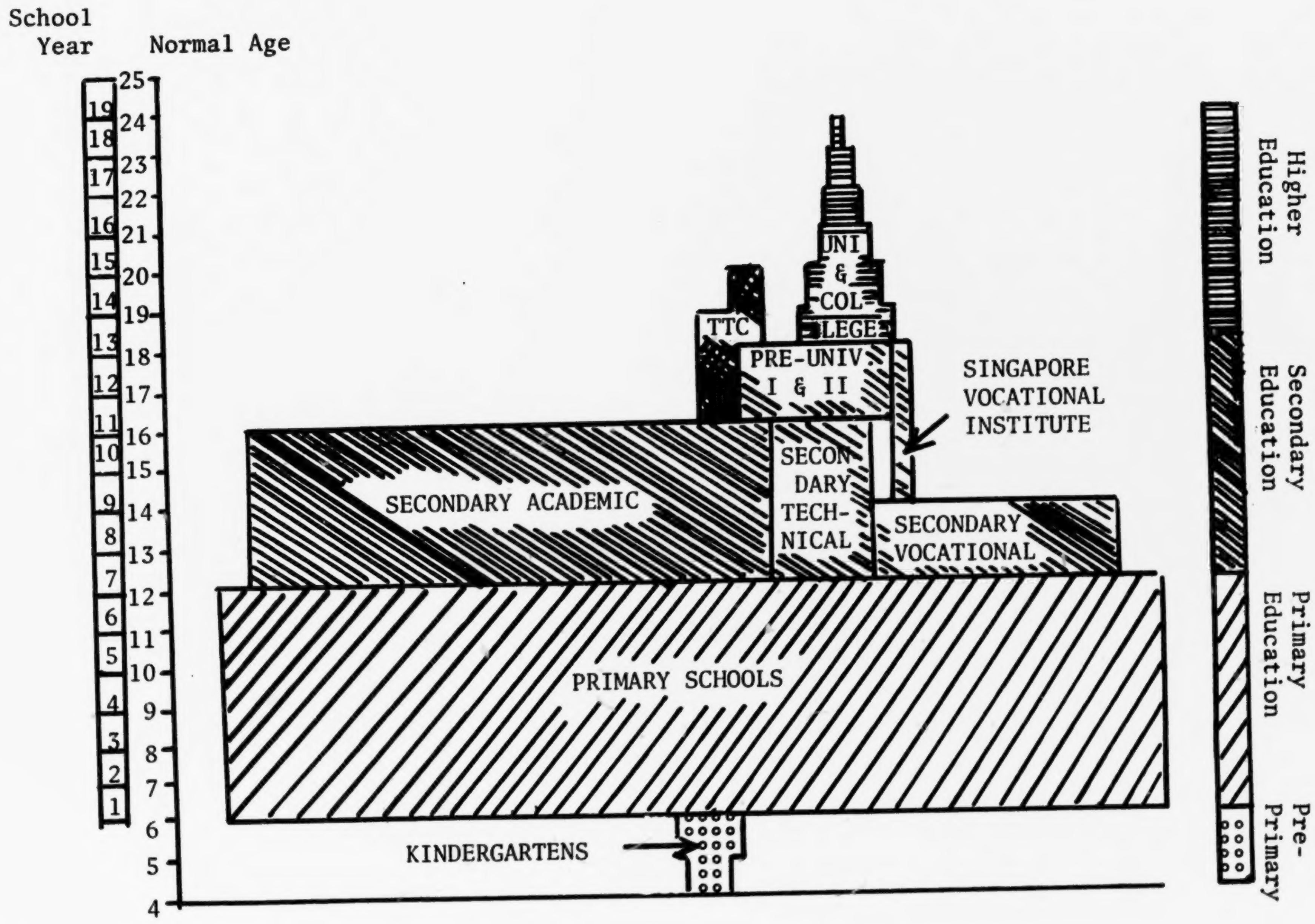
Another problem which has to be given due attention is the proper liaison of vocational guidance programs with the activities of the Labor Ministry in placing unemployed people. The key instrument in the Labor Ministry is at the moment the Labor Exchange. Unfortunately, the work of the Exchange has for a long time been confined to the unskilled and semi-skilled. The Exchange provides each month an analysis of occupations of applicants registered for employment, applicants placed, and applicants awaiting placement. It provides a similar analysis on vacancies. Greatly lacking is a proper range of labor market information and an Employment Service that is able to counsel young people entering the labor market. A start in the direction of instituting a specialized Youth Employment Service has been made.

Conclusion

The program of educational and vocational guidance in Singapore is very sketchy as this area of activity is still new. Immediate emphasis has been on occupational information and career-guidance for school-leavers. There is a certain amount of counseling relating to higher education overseas and careers in professional and subprofessional grades carried out by officers in the Public Service Commission. However, the vocational guidance program will be enlarged and improved upon with more systematic training of career masters/mistresses locally and professional training of more scholars overseas. At the same time, the embryo Youth Employment Service in the Labor Ministry has to be further developed in the direction of counseling or testing job-seekers, disseminating labor market information and so forth. The link between the Vocational Guidance Unit and the Youth Employment Service needs to be more formally established. In educational and vocational guidance the staffing of schools with more professionally trained personnel in this specialized area has to be stepped up, with at the same time, the establishment of child guidance clinics where referrals of difficult cases can be made.

ORGANIZATION OF THE SCHOOL SYSTEM

Appendix


School Year
Normal Age
19
18
17
16
15
14
13
12
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4
3
2
1
25
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5
4
UNI & COL-LEGE
TTC
PRE-UNIV I & II
SINGAPORE VOCATIONAL INSTITUTE
SECONDARY ACADEMIC
SECON-DARY TECH-NICAL
SECONDARY VOCATIONAL
PRIMARY SCHOOLS
KINDERGARTENS
Higher Education
Secondary Education
Primary Education
Pre-Primary

A LOOK AT THE PROPOSED PLAN FOR IMPROVEMENT AND ENLARGEMENT OF OCCUPATIONAL EDUCATION IN THAILAND

by

Nikom Chandravithun[1]

In Thailand the preparation for occupational employment is initiated through regular schooling beginning with primary, secondary, technical, teacher training, and university levels. In 1966 there were 5.2 million students in all these levels. The Department of Vocational Training, Ministry of Education, provides the main source of occupational training in Thailand. These courses given by this agency include: auto mechanics, machine shop, metal work, electricity, radio and telecommunication, and construction; vocational training can also be obtained in the field of agricultural, commercial subjects, and handicrafts. In 1966 there were 18,632 students in some 165 secondary schools offering vocational courses. The required educational standard for participation in the above courses is graduation from the tenth grade.

Technicians, on the other hand, are trained at technical institutes. In 1966 there were nine institutes offering general engineering subjects for 8,705 students, four agricultural colleges with 392 students and teacher training institutes with 545 students. There are seven universities offering professional training in various fields. The total enrollment in 1966 was 36,927. Other training courses are also provided by several departments and state-owned enterprises. Most of these courses, however, are for only their own personnel and are of short duration. The Thailand Management and Productivity Center and the Labor Department do, however, offer labor and management courses for the public. In the private sector, training is beginning to attract the attention of employers. But present training facilities in private enterprises are still confined largely to in-service-training and on-the-job-training.

The second Five-Year-Plan (1967-71) has projected a need of 118,350 skilled workers. However, our best efforts will only produce 92,370 thereby leaving a shortage of 25,980 skilled workers. The anticipated shortage ranges from 1/5-1/2 of the projected demand of skilled personnel and is distributed over various fields such as agriculture, medical sciences, nursing, engineering, teacher training, and science.

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Conflicts and Contradictions

Occupational training projects are primarily planned to satisfy needs of the urban and industrial sector of the nation.

While the industrial sector should not be neglected, at the same time the agricultural and rural sector comprises 80% of the present work force, and warrants greater attention than it is presently accorded.

Present vocational education plans encompass only the youth that has graduated from secondary school (10 grade). The system disregards the needs of approximately 65% of the nation's youth that has dropped out of school involuntarily because of inadequate facilities and educational opportunities.

While manpower needs are urgent in terms of skilled workers, vocational education school programs require a full three-year study tour before graduation and the attainment of a completion certificate.

From observations and evaluations made by employers and other impartial observers, the qualifications and capabilities of vocational school graduates are often open to question.

Questions, Suggestions and Observations

Is a three-year period of study a real necessity for training of skilled workers? Some countries have found that a much shorter period (as short as six months) suffices to provide needed skills in particular occupations, crafts, and trades.

Should not a vocational education and training program be a flexible and elastic program rather than a rigid and inflexible one? In a developing nation this would appear to be even more desirable and necessary than in a more highly industrialized and developed countries.

In Thailand vocational training and education is primarily a part of the over-all education system with prevailing educational eligibility standards for participation. Other developing countries have achieved significant success by enacting national training laws and establishing autonomous and independent training agencies which use and cooperate with other governmental agencies, but have complete freedom to organize and operate a wide variety of programs designed to needs of the nation.

The matter of adequately financing comprehensive training programs is always a barrier to progress. Other developing countries (notably South and Central American) have imposed a small 1% of total payroll assessment upon employers to finance occupational training projects. As employers will reap the greatest benefits from well organized and meaningful training plans it would appear appropriate that the cost should be primarily borne by this group.

Arguments are often presented to the effect that the literacy levels of a substantial portion of the Thai work force are too low to make formal vocational training of any appreciable value. It is considered that such arguments are rebuttable. It may be true that a large portion of the work force is semi-illiterate; but even so it is intelligent, and it has been demonstrated on many occasions that with instruction and training designed to their levels of understanding such individuals can be taught to operate intricate machines and otherwise acquire skills which have a place in our developing economy. It is also submitted that this relatively uneducated sector of the work force will remain a factor for the immediate foreseeable future. Accordingly, training schemes which will increase the productivity and utility of this group will provide the greatest rate of return from training and instruction investment.

While training for the youth of the country and the acquisition of skills by them may be looked upon as an end into itself, the by-products of successful projects are many. It is, of course, the first big step in human resource development. It is also a big factor in the elimination of harmful child labor. It increases the earning capacity for the individual and the standard of living for him and his family. It also increases efficiency and the rate of productivity in the establishment where he is employed. Finally, it all adds to the gross national product and the general social and economic progress of the country in which he resides.

Do we think too little about adult education, both vocational and general? It is often said that "the mind of the child is patterned after the mind of the parent." If this be true, the force of enlightened parental influence may be a major factor in the progressive development of the youth of today and tomorrow.

TUNISIAN EXPERIENCE IN THE ADAPTATION OF TECHNICAL EDUCATION AND OCCUPATIONAL TRAINING FOR THE NEEDS OF THE EMPLOYMENT MARKET

by

Mohamed Ennaceur[1]

Shortly after independence, much consideration was given in Tunisia to education in the context of planning for economic development. The first Tunisian ten-year plan had, therefore, among its aims the extension of elementary education to all school-age children. While planning educational development at all levels in order to benefit all strata of society, the Tunisian Government amended the whole system in order to adapt it to economic and social development needs and requirements.

The present system of general education is based on six years of primary education, followed by six years of secondary education, and from 4 to 6 years of university study, depending on the subject studied. For technical and occupational education we have what we call "middle-education" (a post-primary occupationally oriented education of 3 years duration) and six-year technical high schools.

It is this "middle-education" that is of particular interest to us here. Its goals are to train skilled workers for agriculture, industry, commerce, and public administration. Some of the graduates of these schools of "middle-education" continue their education in other institutions where they acquire specialties such as typewriting, technical skills, elementary school teaching, cooperatives, management, etc. The majority of the graduates, however, will go directly into employment, for which they are supposed to have been adequately prepared.

Experience has shown that, although "middle-education" was conceived for particular economic development requirements, it is not entirely satisfactory with respect to the training of specially skilled manpower. In the first part of this document, we shall analyze this problem. In the second part, we shall present the correctives that have been introduced into this system and which have led to the creation of a parallel system consisting of on-the-job apprenticeship, occupational training, and skill improvement centers which relate to an administrative department other than education. Finally, in the third part, we shall attempt to describe the different steps that have been taken in order to adapt this occupational training system to and integrate its activities with the needs of the employment market.

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[1] President and Director General, Agency for Occupational Training and Employment Tunisia; Member, Board of the United Nations Institute for Social Development. Formerly Representative of Tunisia in the United Nations Social Commission.

1. Limitations of the Educational System in Skilled Manpower Preparation

Although the preparation of skilled manpower is one of the primary aims of the educational system, we see in it the following limitations and inadequacies:

a. Generally, it requires several years to prepare persons for technical or other skilled occupational roles. The education system, therefore, requires adequate "lead time" to adjust to changes in manpower requirements. But accurate long-range forecasts are not easily made. (This is especially true when for political or economic reasons foreign manpower may leave the country on short notice.) Therefore, the traditional educational system lacked the necessary flexibility needed to fill urgent manpower needs.

b. Presently, technical and occupational education is of necessity a basic general education. This is because of the lack of an assessment of the different kinds of skills, the number of workers needed in each of the skills, and a timetable indicating when skilled workers must be available for work. Furthermore, these skills change with the improvement of technological and production processes. Since technical and occupational education cannot adequately follow these changes, a higher degree of specialization is not feasible.

c. Although a practical training program exists in technical and occupational education, experience shows that the young graduates lack manual dexterity and what we call "industrial rhythm." This situation is a source of continual conflict between employers, who refuse to hire these youngsters at the salaries of skilled workers because they are not able to turn out a normal production, and the new graduates who refuse to accept lower level positions which pay less. This present technical and occupational education has given these young graduates a false sense of qualification and has created in them expectations that lead to conflict and disappointment.

d. The regular school system of technical and occupational education is based on age-group homogeneity, which establishes a maximum age for each degree. This does not permit the possibility of continued education for adults and workers who, in the course of their careers, feel the need to perfect their technical and occupational knowledge in order to receive promotions.

e. Finally, the system of technical and occupational education, by its conception and academic structure, neglected the training potential that exists in the factories which have good equipment and qualified personnel that could be used profitably for educational purposes.

2. Corrective Measures Applied to the System of Technical and Occupational Education

As the shortcomings of technical and occupational education became evident, the government created new institutions to correct and supplement the existing system. These institutions were created under the Department of Social Affairs and are now managed by the "Office de la Formation Professionnelle et de l'Emploi" (Agency for Occupational Training and Employment).

The following is a summary description of these institutions.

a. The centers for accelerated vocational training:

Shortly after independence, the government had nationalized such key production sectors of the Tunisian economy as transportation, electricity, etc. These sectors of the economy were owned by Europeans and hired mainly European workers. Therefore, as a result of this measure, we saw a massive exodus of the foreign workers and were faced with new and urgent needs. At this point, knowing that the existing technical and occupational education was not adaptable to meet these new needs, centers for accelerated vocational training were created. These centers constitute a kind of safety-valve and provided a means of meeting an increased and unexpected demand for labor.

The teaching methods used in these centers is that utilized in other countries. We have, however, adapted French standards and courses to the Tunisian context. Recruitment into the accelerated vocational training is open to people who have a minimum level of instruction and are seeking a job. There is no age limit.

b. The skill improvement centers:

The aim of these centers is to provide a specialization for the young graduates from the "middle educational" system. This specialization should correspond to their basic training. For example, industrial electricity graduates are trained to become specialists in electro-mechanics, electrical network equipment, electrical measurement, and control machinery. In the case of electrical workers, the training of specialists corresponds to the specific needs of the Tunisian electrical companies which participate in the financing of this electrical skill improvement center and which are directly responsible for its operation.

Similar centers exist in general mechanics, auto mechanics, agricultural mechanics, shoemaking, and woodworking. These centers also benefit from the collaboration of the employers in the branch of specialization to which the program relates.

c. On-the-job training:

The government still had to face the problem of finding employment as skilled workers for the young graduates from "middle-education" discussed above. We developed, therefore, a program of "on-the-job" training which consists of placing the graduates as trainees in factories for a period varying from three to six months. During this period the employer pays nothing, but must give the young trainee a job in his field of preparation and follow up on his practical training. During this period the government grants the trainee a subsistence scholarship. At the end of this period, the trainee is either definitely hired or rejected. This system, although costly to the government, has shown good results.

d. The government has also created "upgrading" courses in order to enable the workers to satisfy their rightful needs for skill improvement and occupational knowledge so that they may achieve higher positions and higher earnings. These courses are given at night and are offered at different levels. They may possibly lead to the rank of engineer. The courses are divided into three cycles, each one terminated by an examination.

Parallel to this, practical skill improvement courses are given for workers in fields such as electricity and mechanics, for the purpose of acquainting the workers with new techniques and procedures. Courses of this type will soon be extended to other skill areas.

e. An apprenticeship system has been organized by the government in order to utilize the factories' potential for occupational training. Until recently, apprenticeship was regarded as an archaic means of producing skilled manpower. At present, apprenticeship is organized under a law which has created an "apprenticeship contract" determining the obligations for both employers and apprentices. Educators have been especially trained to supervise the apprenticeship system. Supplementary courses are given to the apprentices so that they may broaden their general education and their technical knowledge.

Before entering into apprenticeship, the trainees spend a year in pre-occupational training centers where they learn to handle tools and acquire correct attitudes. At the end of the year, they get good counseling that helps them to choose an occupation corresponding to their aptitudes. There are three alternatives: they either enter into apprenticeship, are directly hired, or enter an accelerated training center. The pre-occupational centers are financed by UNICEF and are open especially to youngsters who have not had the opportunity of entering a secondary or occupational school for reasons either of age or lack of space in the schools.

3. The Adaptation of Occupational Training Requirements to Manpower Skill Needs

The different training institutions described above supplement the educational system. Nevertheless, from its inception, we felt the need to place occupational training directly in the factory. The government thought that the responsibilities for occupational training were primarily those of the employers. This idea was not initially accepted by the employers, as they found it easier to acquire their skilled manpower from other firms, thus encouraging a high rate of labor turnover.

As a result, the government tried to sensitize employers to this problem and to make them conscious of their responsibilities in the training field.

With this action, the government was faced with the tendency to rigidity and institutionalization that could introduce into this new occupational training system the same difficulties that are confronted in the existing technical and occupational education system. It, therefore, created a number of opportunities that would attract the employers' interests to occupational training so that they would participate more actively in it. The action taken in this area is analyzed as follows:

a. The establishment of an occupational training tax:

In 1956 the government established the occupational training tax, which is paid annually by each factory in an amount proportional to the total salaries paid by the factory. The law establishing this tax provides for a reimbursement to employers who conduct training. This reimbursement may cover part or all of the employer's training outlays. Depending on the extent of their effort in this area, some of the factories can even be totally exempted from the training tax.

b. The creation of the National Council of Occupational Training and Employment:

A 1964 law created the National Council of Occupational Training and Employment and subordinate regional councils. The National Council is headed by the Secretary of State for Social Affairs, and the regional councils are headed by the regional governors. The councils consist of representatives from employing organizations and labor organizations interested in occupational training, including the Department of Education. These councils study all problems concerning the development of occupational training, the improvement of training methods, and the equilibrium of the employment market. These councils are mainly of a consultative nature. They provide the government with suggestions and proposals which can be translated into action.

c. The "Sectoral Commissions":

Within these councils, commissions are created for the different sectors of economic activity. Employers from the same sector constitute a commission where they discuss the general problems concerning their specializations. Work groups are then established in order to set up training programs or new training projects related to specific needs.

d. The Commission on Course Equivalence and the National Examination Board:

Once established, the training programs are presented for approval to a professional group from the specialization concerned.

The process is the same for examination topics, which are chosen by a National Examination Board for every specialization. At the local level, a technician from the industry will give the examination, score it, and confer the appropriate degree.

e. "The In-Factory Integrated Centers":

For some cases, such as important factories or organized groups of employers, the government established the "integrated" center. This is a training institution which is managed by a mixed committee headed by the employer and is sometimes located in the factory. The government gives subsidies to these integrated centers, but the employer must also participate in its financing.

Conclusion

We have shown the different measures adopted by the Tunisian government in order to obtain cooperation from industry in the area of occupational training, with the purpose of adapting such training to the requirements of the employment market. The tendency now is to transfer responsibility for training to the employers, so that the government will be responsible only for general education, counseling, and coordination at the national level. It is for this purpose that the Agency for Occupational Training and Employment has been created recently. This organization is financially autonomous and is directed by an administrative board composed of representatives from labor and employer organizations and from the Departments of Education, National Economy and Planning, and Social Affairs.

The fact that the same institution will deal with both employment and training problems clearly shows the close relationship we intend to establish between these two activities, both of which tend toward the same final goal: economic development combined with human development.

Given that we agree on the need to link occupational training with employment, we must be concerned about how to avoid undue overlapping of the educational system and the occupational training system. Since these two systems should normally supplement one another, it is obviously of major concern to try to establish a certain equilibrium between them. Certainly the pedagogical methods employed by these two systems differ, but they have developed in response to conditions faced by the respective systems and coexist. The people involved in these two systems are also different, and this marks rather clearly a line of demarcation between the systems. However, both systems have as their goal the preparation of skilled manpower, and this may produce a risk of overlapping or duality between them. This risk has been reduced by the establishment of close cooperation between, on the one hand, the Departments of Education and of Economic Development and Planning, and on the other, the Agency for Occupational Training and Employment.

Presently, after ten years of experience, the government is working on an educational reform. This new reform will certainly take into account the necessity of establishing, insofar as possible, close and direct links between education and employment. An ideal solution for avoiding duplication of effort between the systems of education and of occupational training may be approached if these links are established, if employers accept their responsibilities in the field of training, and if the educational system, on its part, will drop its claims on the training of manpower for specific skills and limit its efforts to basic education.

Meanwhile, however, the pragmatic approach described above has, so far, given good results that testify to its efficiency and suggest its continuation for some time to come.

IV. AGRICULTURAL AND RURAL ASPECTS OF OCCUPATIONAL EDUCATION AND TRAINING

A. Report of Workshop Discussion

A Report of the Working Group and Plenary Discussions

B. Related Workshop Papers

Notes on Education and Training for Agricultural Development
by R. H. Allee

Occupational Education and Training for Rural Development
by Delfin Quirolgico

Some Background Comments to a Discussion of Occupational Education and Training for the Development of Agriculture by Peter Hopcraft

IV. AGRICULTURAL AND RURAL ASPECTS OF OCCUPATIONAL EDUCATION AND TRAINING

A. Report of Workshop Discussion

In planning the Workshop, account was taken of the fact that although agriculture is the leading occupation in newly developing countries and agricultural development is highly important in over-all development, people concerned with manpower requirements and occupational education and training have rather neglected the field of rural development. For this reason, special care was taken to include a number of persons with agricultural interests in the conference, and some extra papers were solicited in this field.

Dr. Allee's very interesting arguments made in a conference paper distributed to participants and in a subsequent letter appear here at the end of the section. Dr. Quirolgico was good enough to submit several substantial papers on this subject, which were made available to Workshop participants and appear in a condensed form also at the end of this section. Also to be found there are Some Background Comments on the Discussion of Occupational Education and Training for the Development of Agriculture prepared by Mr. Peter Hopcraft and circulated to the Agricultural Working Group. Mr. Hopcraft also prepared the following account of the discussions of that Working Group, including relevant material from the plenary sessions.

A Report of the Working Group and Plenary Discussions

Early in the Workshop it was recognized, particularly by those with experience in low-income countries where agriculture is the overwhelmingly predominant employer of labor, that some of the most crucial problems of education and training for development concern the agricultural sector. For many of the largely rural economies it was made clear that industrialization would not succeed in the absence of far-reaching changes in the agricultural sector where stagnation, or at least inadequate growth rates, appears to be the rule rather than the exception. Dr. Allee, with his very wide experience in Latin American and Asian agriculture, asked the arresting question: Why is it that Asia had to import thirty million tons of food grains during 1966?"

From the point of view of involving the great mass of the population in the development process and of providing an economic base for the support of other industries, the development of agriculture was seen to be of critical importance. The manpower implications of a vigorous agricultural development program in a low income, predominantly agrarian economy are too little known. Manpower planners have concerned themselves almost exclusively with non-agricultural industries, despite the relatively small percentage of the population that these industries employ. The chronic neglect of training and competence at both the professional and the subprofessional levels in the various agriculture-related disciplines was cited for a wide range of low-income countries despite their heavy dependence on an increase in the productivity of this sector. This neglect, as Professor Brunner pointed out, stood in sharp contrast to the enormous and continuing effort that is made in this regard at every level of the educational system, formal and nonformal, in the United States.

In discussing the employment problem in predominantly rural economies, Dr. Skapski emphasized the extremely high cost per additional worker employed in highly mechanized industries and contended that in the foreseeable future such industries would hardly scratch the surface of the massive employment problem faced by these countries. The capital costs of small industries were considerably lower per employee, but in this case there were problems of the productivity of capital. The only hope of dealing with the problem of providing productive employment for the vast mass of the labor force for the foreseeable future lies in converting subsistence farming into productive commercial farming. The main source of income for many years to come and the heart of any successful development program is agriculture. In view of this situation, Dr. Skapski decried the tendency of the schools in a number of newly developing countries to educate their people away from agriculture. He cited the Aiyetoro Comprehensive High School in Western Nigeria as an example of the successful combination of academic and practical training where students undertake some sort of agricultural work as a part of their curriculum. The operations are run on a commercial basis and the students sample the "taste of money" while overcoming their prejudice against working with their hands. Other speakers stressed the need to educate rural youth for a wide range of occupations and skills to equip them for both rural and urban life.

Dr. Allee thought it would be a wonderful thing if by some magic suddenly all rural people up to the age of 18 could go to school where they could learn to be citizens, and then have the choice of either going to the city or staying in the rural areas. But this is not now possible. He pointed to the realities of rural poverty and expressed the view that any progress in the rural areas must begin with increased production. Much time has been wasted giving the farmer a type of general education that does not equip him to be a better farmer or increase the productivity of his farm. He cited some of the dramatic new varieties of cereal grains and pulses that are now available--varieties that can quadruple the farmer's yield. His experience was that the farmer is not resistant to change when innovations of this sort are available to him; the farmer is resistant to the inept and incompetent agent of change who understands neither the new technology nor the nature of the management decisions the farmer faces. He described a series of adaptation and testing centers where the locational adequacy of new varieties is tested. These same centers are used to train a selected group of extension staff to become specialists in the new technology and to give them some knowledge of the management problems of the farmer.

The salient features of modernizing a farm business are too little known, Dr. Allee continued. Technically competent personnel have too often failed because of their ignorance of the economic environment into which they are introducing some innovation. He characterized the farmer as a man with a tremendous fund of specialized knowledge and a quality of initiative that has proved extremely hard to transfer in a formal school situation. Field workers must be familiar with the resources and limitations of the farmer and the credit, input supply, and marketing programs available to him. He emphasized that everything must start with increased production and go on from there.

Dr. Staley emphasized the employment problem. He stressed that agriculture must provide modern productive employment for the mass of people who could not possibly be absorbed for many years to come in non-agricultural industry and commerce. One of the main results of even a little education--even elementary education--is to make people want to move into the modern sector. If the only modern sector employment is in the urban areas, there are not going to be enough jobs for them. The modernization of agriculture, therefore, assumes great urgency. The techniques of modernization should not be those that minimize the use of labor, but rather those that complement labor and increase yields per hectare.

Several researchers in this area have, according to Dr. Staley, proposed that in a number of countries there should be a transfer of resources from expenditure on elementary education to expenditure on agricultural extension and other training programs for rural development. It is possible that the numbers of trained people needed to spearhead a comprehensive rural development program would be at least equivalent to the total number employed in the formal school system. Instead of turning out, through the primary school system, people who cannot find jobs, he suggested moving some of the resources toward producing jobs that could increase the income with which the primary school system could then be expanded.

Dr. Allee agreed with Dr. Staley but felt that in a number of cases with which he was familiar there could be considerable savings made in a reorganization of the extension service itself. In some countries there are more than enough people scattered around in the extension service. Its numbers should be reduced to those agents who are competent to make adaptations and studies: identify the problems, work out a method by which the farmer can substantially increase his production, and mount a demonstration on a farmer's farm that really demonstrates. Most demonstrations do not do this. Poor extension work merely insulates farmers against change. Too many agents lack technical competence and an adequate understanding of the local problems of the farmer. An extension service must be backed up by continuing technical training for the personnel and with supplies of the new inputs the farmer will need.

Other speakers agreed that training in technical matters, as well as the broader aspects of agricultural development, is essential. Extension workers must be able to diagnose the problems of their farmers and help determine a way of tackling those problems. Extension workers who are incompetent in the biological and technical aspects, and in the economic, farm-management, and marketing aspects of the farmer's task, might better stay home. In a number of countries with large extension services there are serious deficiencies in this regard.

Dr. Pinkau stressed that the problem of increasing agricultural productivity is more than merely reaching the farmer and training him through extension services. It has to be considered in the context of the development of the rural area, not merely as an isolated agricultural problem. Agriculture-related industries, business, marketing, banking, and administration must grow up. While new job opportunities are being created in those areas, training must be provided to supply qualified personnel. In addition, transportation, communication, power, and water systems must be developed if the productivity of agriculture is to increase--and that means to induce a complex social change.

The next problem, raised by Mr. Ozoro, was the difficulty of attracting the most capable and talented people into the areas of the economy where they are badly needed. In Nigeria there had been initial difficulty in filling agricultural training institutions; and even now, when the lack of alternatives lead to the filling of every available place, the graduates merely want to go on to further education with a view to leaving agriculture.

Mr. Ennaceur spoke of a similar problem in Tunisia and said that the costs of creating remunerative jobs in agriculture in that country are high because of the high costs of irrigation. Without this capital investment, these more remunerative jobs will not be created and the youth will not be attracted into agriculture. The mere teaching of agriculture in the primary schools would not be an answer to this problem. Furthermore, there is the task of changing the social image of the farmer, and this cannot be done quickly. It must, however, go on, both in and out of school.

Mr. Hopcraft suggested that the reason for the apparent unpopularity of farming is in reality the predictable preference for the higher pay, better conditions, and the resulting higher status that has been associated with nonfarm employment. In areas where farming is known to pay well, it is generally seen as a highly desirable occupation by the youth. It is hard indeed to motivate people toward farming where it is known to be unremunerative drudgery, especially if an easy life and higher earnings are believed to be available in the cities. Any long run solution must involve reducing the enormous earnings differential between town and country and increasing the opportunities within the agricultural sector by providing the economic, technical, and institutional environment for profitable farming. Assuming that people will seek out for themselves the most rewarding occupation available to them, the task is to let the wages in the various sectors reflect the real scarcity, or otherwise, of personnel. In a number of countries, artificially high earnings in the bureaucracy and the non-agricultural sectors are a remnant of the time when manpower in this sector was extremely scarce. Earnings have frequently not changed with a decreasing scarcity of trained manpower, and the earnings differential has aggravated the rural-urban migration and made it worthwhile to gamble on getting an urban job.

Dr. Brunner agreed that farming must be manifestly profitable if it is to become attractive. He did not agree that the school was an ineffective place to change the attitudes and occupational competencies of the youth. He claimed that the United States experience of training hundreds of thousands of students in agriculture in the formal school system had been highly successful in preparing and motivating young farmers. In a situation of changing practices in the rural areas, what is really essential for the youngster is an ability to understand words and directions, spoken or written, and to transpose them into action suited to his particular conditions. An applied training in agriculture in school could lead to young men becoming able to communicate intelligently with extension workers and apply whatever new technologies are available to their production system.

Dr. Brunner also stressed the need to train teachers and extension workers in an "outgoing literacy" that would enable them to communicate with those they would be instructing. The education of teachers he regarded as the essence of any training program. The neglect of this aspect in aid programs has been a fundamental mistake and often resulted in excellent scientific work never reaching the farmer. He reiterated that the farmer is skilled and knowledgeable in a wide range of areas. The teacher and extension worker must know how to build on this knowledge and experience to introduce the farmer to new developments.

Dr. Staley spoke of the general principle that specific occupational training should, as far as possible, be reserved for those who are already committed to that particular occupation and, in general, should be given at the point of entry into employment, or after having taken up employment. The arguments in favor of this principle are that there are fewer dropouts and the knowledge gained is more immediately put to work. He wondered whether this principle could also be applied to agricultural occupations.

A number of other people expressed the view that any attempt to increase the short run productivity of agriculture and introduce new technologies into the production system must involve reaching the farmer-decision maker. Specific occupational skills and applied knowledge and information must be available to him along with necessary supplies to be incorporated into his production system. Teaching new skills to his child in school will only marginally affect his productivity, and it will be many years before that child becomes the decision maker on the farm. Similarly in the preparation of extension workers, teachers, and other para-agricultural workers, much more of the applied training should be done after a commitment to the employment. It was strongly suggested that continuing education and training for such personnel is as important as the initial training, and frequently far more important.

Dr. Allee stressed that the funds directed toward the rural areas must go into investments that pay off. Investments that are made in isolation frequently become a public burden. He mentioned irrigation projects that fail to provide for introducing the new technologies, supplies, etc., which would allow the farmer to take advantage of the water. Such projects are not likely to amortize themselves. The same thing might well be true for vocational schooling that is not part of a combination of investments to raise the productivity of agriculture. An agriculture that is unrewarding results in an effort by vocational school graduates to seek employment elsewhere, despite their expensive training.

Dr. Allee then discussed the broad range of new technologies that must be introduced into the farming system before productivity can be expected to improve. Enough time has been wasted trying to improve traditional agriculture without providing new technology and new inputs. It has proved fruitless. Furthermore, the people who have worked with the farmer have too often not been technically adequate. They have not been familiar with improved varieties of seed and have not known how to conduct local tests. Such personnel must know the proper amounts of fertilizer to use locally, how to control the pests and diseases to which the crops are subject; in short, how to radically increase the farmer's productivity and profit. Otherwise, the farmer might as well be left to his own devices. There has been far too much time wasted on helping with amenities and ignoring production. It is time to stop calling that sort of program "agricultural development."

Dr. Allee described some of the new varieties that have been developed in the last few years. They represent a vast improvement in output that is available to tropical countries. What is now needed is people who are competent to introduce these varieties to the farmer, together with the other inputs and the technology that goes with them. Modernizing farms need the support of a range of rural businesses, institutions, and trained personnel. Often the personnel is there, but there is a chronic need for training and retraining. The same thing is true in the areas of input supply, credit, and marketing. The middleman is commonly conceived of as the villain, but the problem generally is that he is as old-fashioned as the farmers he serves. Instead of criticism, he needs training and aid and, above all, an increased volume of produce coming from the farmer.

The logical center for all of these operations and ancillary industries is the rural town, and Dr. Allee strongly endorsed the notion of town-centered growth. It is in the towns that financial centers, processing industries, and organizational centers for rural activities develop. It is also from the towns that political power is generally exercised. The orientation of the local political leadership and the efficiency of the administration are crucial factors in rural development; and Dr. Allee described a number of programs to reach them with training materials, new ideas, and information. The mayors and counselors, governors, legislators, and other policy-makers must be familiarized with what development entails. These people must be trained to become functioning professionals at their jobs.

Of particular importance in the efforts to reach the farmer is that the adaptation, testing, demonstration, promotion, and training centers in these areas be tied into the research system. Without solid organizational links, the extension system lacks the knowledge it needs, and the research system works on the wrong problems. Dr. Allee described the Japanese experience where extension workers were trained in, and operated from, the research station. Other countries that have not maintained this link have found their extension services becoming increasingly void of content and competence and their research stations becoming increasingly academic.

The universities, and particularly the colleges of agriculture, must prepare themselves to assist in the development process. They must do the kind of research that will develop an understanding of the salient points in a modernizing farm business as time goes on. They must study the marketing systems. They must know where the inefficiencies are and where there is potential for change. Dr. Allee stressed that only then could they mount rational training programs that could hope to bear fruit. There is far too little microeconomic research utilizing primary data going on in these institutions. The universities and colleges must be concerned with the training of trainers. But too often they themselves know far too little about the biological or economic environment.

Dr. Quirolgico pointed out that the educative activities aimed at agricultural and rural development must emphasize equally the proper preparation of new entrants into the agricultural and rural occupations and the upgrading of the competencies and productivity of those engaged in such occupations. Most of the youths entering school will drop out before reaching the university, thus the early levels of the educational program should help students to acquire basic agricultural knowledge and competencies. Moreover, university-level agricultural education will succeed only to the extent that the quality of instruction in the primary and secondary levels provides an adequate foundation for further scientific study and research.

Assistance to agricultural education and training should help the system to ensure a balanced supply in terms of quantity and quality of farmer-entrepreneurs, agricultural service personnel, agricultural technicians, and agricultural scientists and researchers. Educational priorities should be determined by this need for a balance in agricultural manpower. Agricultural scientists and researchers are indispensable, but it would be a tragic mistake to create a class of elite university level agricultural scientists without a coordinated focus on creating a body of teachers and other transmitters of applied science and technology at the farmers' level and upgrading the specific productive and entrepreneurial skills of the farmers themselves. The training methods must take into account the literacy level of rural people, and the programs must be designed to meet the needs of the individual farm family.

Dr. Quirolgico reemphasized the belief that the development of the rural area is the wellspring for further industrialization. The task of commercializing and industrializing agriculture is in large measure the task of providing the requisite environment for the farmer and of reaching him with the necessary knowledge.

Dr. Allee strongly agreed. He attacked as very damaging to rural progress the notion that the rural problem is hopeless until everyone has had formal schooling. Despite the complexity of modern agriculture, we can get increased production with the kind of people we have now. They can be influenced and they can be taught the skills, and we can get this essential start in rural production without waiting for generations of education. These people may never have been to school in the usual sense, but they can, nevertheless, be brought into the development picture very effectively.

Dr. Staley summarized the discussion by reiterating that the newly developing countries are concerned with producing a modernized commercial agriculture which must gradually replace a traditional subsistence agriculture, and that the kinds of qualified personnel required for the former are very different from the kinds required for carrying on the latter. In particular, a modernizing agriculture becomes much more specialized and requires much more cooperation between specialists than the old type. It is no longer the farmer by himself. Certainly the farmer needs increasing amounts of education and training if farming is to become more productive, but a variety of other personnel are also needed. Research workers and competent agricultural advisers and technicians are needed. A wide range of farm-related businesses, cooperatives, and middlemen are needed; it is extremely important that there be poeple who can market the products of the farmer and supply him with his fertilizer, insecticides, and other nonfarm inputs if he is going to use modern methods. These people all need training, and they need constant upgrading as agriculture develops.

Finally there is the need to reach, inform, and train the local leaders and decision makers. Insofar as they are traditionalist and ignorant of the requirements of modernizing agriculture, and there is little hope of successful modernization.

Dr. Staley likened modern agricultural production to a modern factory assembly line. If the necessary inputs are not available at the right time and the right place, and if the products don't move out through the marketing system, the production system breaks down. Manpower planning in newly developing countries must recognize this interdependence.

B. Related Workshop Papers

NOTES ON EDUCATION AND TRAINING FOR AGRICULTURAL DEVELOPMENT

by

R. H. Allee[1]

Why is it that Asia had to import 30,000,000 tons of food grains during 1966? The answer is not simple, but some of the salient factors are now discernable and can be taken as points of departure. These factors relate to the correction of *a priori* notions about development strategy and to the lessons of experience on social technology. Samples of such factors are presented here as propositions for discussion with emphasis on education and training:

Since prices of manufactured goods tend to increase faster than prices of raw materials, it often has been assumed that industrial production should have priority over agriculture. For this and other reasons, rural feeder roads, agricultural research, functional personnel preparation, and such have been neglected. A result has been inadequate food supply, shortage of agriculturally produced raw materials and markets for industry plus diminished foreign exchange earnings at a stage in development when agriculture is the main source of foreign exchange.

Overemphasis has been placed on rising national incomes without due concern for a parallel and direct attack on the bases of physical poverty. As a result, the major portion of potential producers (those in rural areas) have tended to remain close to a subsistence level and unable to contribute to development.

Cities have too often been considered as opportunities for prestige buildings, deluxe residential suburbs, and obstentatious cultural centers, rather than as places for the exchange of goods and ideas.

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The grass roots fallacy has brought about the isolation of extension agents in villages and neglect of the essential town-centered nature of rural development.

Too much importance has been placed on over-generalized and outdated ideologies and too little on skills, knowledge, and values pertinent to successful behavior.

Too much energy has been expended on the minor improvements which can be fostered in traditional farming and too little energy expended on obtaining major gains from the production, adaptation, and application of new technology.

Leadership, group dynamics, and other methods of promoting change have been taught to extension agents, but too little importance has been placed on technical adequacy and technical appropriateness both of the practices recommended and of the extension agents. The result has been farmer resistance not to change but to inept change agents and unfeasible practices.

Since trade schools have successfully trained carpenters and mechanics in cities, it has been assumed that specialized secondary schools can train future farmers. The result too often has been a system of inefficient and overly expensive preparatory schools for higher education or white-collar employment of farm youth.

National plans for agriculture as an element in the over-all economy can be prepared centrally with supportable margins of error if statistical data is reasonably accurate and current. It is desirable that production plus imports to sustain at least a minimum adequate diet for calculated population levels enter into national estimates of need, budgets, and manpower. It also is desirable that purchaseable inputs for agriculture to be produced or imported be estimated and that resultant foreign exchange requirements plus the role of agriculture in generating foreign exchange be calculated as realistically as possible and in relation to the demands and requirements for all development. Some low-income countries have been able to do this. The gap seems to have been in recognizing that "rice is not produced on the pavements of the capital city" and that all centrally-made plans must remain subject to adjustment as experience is gained in increasing farm production. This is a fundamental policy question the mere statement of which achieves nothing. Training pressure must be applied on all concerned from national executives, legislators, and top planners to farmers.

It is unlikely that significant increases in production will be stimulated so long as the prevalent system which attempts to fill a pipeline with bodies from the capital city almost to the village is used, particularly if the system is copied after that of countries with differing situations to face. It usually has proven equally unfruitful to isolate extension agents in villages, to employ task forces, to organize coordinating committees, or to use any of the several cleverish measures schemed up around tables in central places. All such schemes fail because they are unrealistic in terms of the actual factors involved in increasing production and in solving the associated problems of supply and marketing. At this point there appears an apparent dilemma. How can enough increased farm production be stimulated so that there exists experience on which to build a system for promoting production? Obviously there must be some understanding in high places concerning the fundamental importance of bottom-up planning and a permissive attitude toward training of trainers plus budget and personnel allocations. This is a point where foreign assistance can be of strategic value both as concerns technical advice and bottle-neck-breaking finances. Such assistance is available in the Indonesian case which follows.

The Indonesian agricultural program now in evolution emphasizes the obviously necessary changes needed in agricultural production factors. The initial point of concentration is rice with corn and beans (including soy beans) next in line. When these three basic elements in the tropical diet are assured, the food problem is well on the way to solution. Also with a volume of these crops becoming available, the promotion of market efficiency and other activities in support of modernizing farming become feasible operations. This is a step-by-step approach which takes advantage of the experience gained in the Bimas (mass guidance for food production) program. This effort during the past three years has increased production through the action of student volunteers. The students are coached, mainly at the Bogor Rural University (IPB), in the factors of production and in choosing areas with understanding production potential --irrigation, drainage, transport. They spend the entire crop season from soil preparation to harvest working with farmers. An effort is made to supply the Bimas areas with improved varieties, fertilizers, and pesticides.

The "systematized Bimas" now being initiated includes intensive training during six months of selected staff who will become permanent professionals in the promotion of food crop production. This training will be carried out in Bogor under the cooperation between IPB and the central Food Corps Research Institute of the Ministry of Agriculture. Certain staff members of the Ministry and IPB are being sent to the International Rice Research Institute, Los Banos, Philippines, with AID financing. These trainees will bring to the Bogor center some of the features in the "breakthrough" in rice production specialist training achieved at IRRI during the past three years.

Thirty rice production specialists will be trained at Bogor during the crop season which begins in December, 1967. During the second crop season in 1968 the specialists will be established in simple adaptation testing, demonstration, and training centers in the prime rice areas under technical supervision of the Bogor staff. They will test varieties for local adaptation and determine optimum fertilizer and pest control practices, including insect and rat control. They will choose cooperating farmers, assist them in establishing demonstrations and in maximizing their impact on local farmers. They will give apprentice training to selected extension agents. Volunteer students from agricultural colleges will continue to be used both directly and in cooperation with crop production centers. The process will be continued to cover, initially, the prime rice area of about 600,000 hectares (about 1,500,000 acres).

It should be kept in mind that significantly improved technology is now available. By concentrating the area, the provision of improved seed, the fertilizer and pesticide supply problem is simplified, and competent staff can be prepared as the program advances.

As I understand the new Indonesian program, it is recognized that increase in production is only the start, but it is the start to everything. Unless real help can be given to the farmer in increasing production, it is better to leave him to his own devices. With increasing production, through the adaptation testing centers or otherwise, a wider range of problems can be tackled including markets and price incentives, credit, supply services, transport and communication, group action, and extension education. Once the complex of services in a town-centered work area has become a functioning unit in a few areas, the broader organization problems of articulation with intermediate and central agencies and concerns can be worked out pragmatically. Local units can be integrated into a national system and contribute to comprehensive national planning.

While this significantly Indonesian process is evolving, there is a strategic role for the university-level training and research institutions to play. IPB and other agricultural institutions as they grow into competence can supply the creative research, the versatility and continuity of effort required as they contribute to the national process and learn from it. They can train functional staff and can predict the features of a modernizing farm business, an expanding market, patterns of investment, and town-centered development.

We are concerned here with a new field of human endeavor. Even though the assurance of titles to land and the stimulation of transportation improvements benefitted agriculture in the early days of our Republic and the homestead act, the land grant colleges a century ago continued this stimulation, the out and out assumption of public responsibility for the welfare of farming and rural people began with Baily, Pinchot, and Theodore Roosevelt in the early days of the present century. In much of the world that we now term underdeveloped, farming remained a peasants' affair or that of the landed gentry and estate owners until a much later period. Development economics, as we know it today, with at least a subsidiary concern for agriculture, really got underway with the germinal works of W. Arthur Lewis and Eugene Staley less than two decades ago. This new intellectual concern, understandably, has been applied mainly on efforts to become reliably analytical about the socioeconomic problems of development. It appears to have been more useful to manufacturing where, for instance, a branch plant could be imported with all its efficiency factors from an industrial country than to agriculture subject to the variables of soils, climates, and human behavior and carried out, typically, on a myriad of small farms.

What seems to be generating is a horizontal culture of economists, sociologists and such who are learning to talk across the world to each other but are much less at home in the critical process of promoting increases in production in specific places. The new type of international behavior known as technical assistance has innoculated various countries with one version or another of the classic American extension pattern, community development promotion, and other schemes. With a few exceptions, the resulting programs have cost more than they were worth. At times someone has recalled that the invention of the subject matter specialist in the 1920's made American extension pay off, but the resulting plaster of a new feature on a nonfunctioning system also failed to function.

Now, due to the analyses of Hopper and Moseman, some experience in a few countries, we know how to train for and promote crop production. As indicated in the Indonesian case above (and in Japan) technical adequacy must be trained into field workers, factor by factor, with operational relations maintained between promotion and research. We know much less about how to train for fostering a modernizing farm business, for administering credit and other financing, or for the distribution of inputs and increasing the efficiency of marketing. Also, only the developed countries seem to be making progress on the analysis of community resources and on training for their optimum utilization. Politics continues to be a bad word and yet, in most cases, no one will "bell the cat" unless politicians, local and intermediate officials are enlightened and trained. No doubt, in all these occupational areas, functional factors need to be located and defined and provision made for continued pressure on rising effectiveness in supporting development. Much of the ability to do this, in the long run, will depend on the quality of education in primary and secondary schools and the extent to which the universities educate for resourceful scholarship and inculcate an appreciation of the need for primary data on which to build understanding. Furthermore, the mass media have a job to do not only in informing but in helping to create a sense of urgency in solving the problems of development.

It is not difficult to get quick agreement that a certain percentage of all university graduates should be prepared to contribute to the business of food production. This is based largely on the assumption that if the "science" is known, it will be used. Specific attention to the typical practical situation in the usual concept of "agricultural development" shows an "extension specialist," enthusiastic about his specialty in science, using "laboratory" language with a farmer or worker who has probably had no more than four years of schooling; expecting that man not only to understand words with which he is not familiar, but at the time of planting--the operation that could well mean prosperity or want at the time of harvest--expecting him to change his practice, casting aside the practices learned from his respected father, based upon all the folklore of previous generations. Furthermore, these changes can properly be seen in the light of risks--with his meager resources, not the resources of the extension man or the university. True, a few successful "examples" will make a few more converts, but each step forward requires a whole growing season, usually a year.

What is really essential in the situation of changing practice is an ability to understand words and directions spoken or written, and to transpose them into action suited to his particular conditions, whether a boy gets it as a part of elementary schooling, or as a part of general secondary school, or in a "vocational" program which is a part of either. Some call this "literacy," but we should consider also the importance of an outgoing "literacy" on the part of the teacher--an ability and a willingness to speak, give directions, and act in a way so that a farmer, even though he has had only elementary schooling can understand and see how the changed practices apply to his particular problem. This is a matter of teacher-education; but, surprisingly enough, after all the years of six different United States colleges of agriculture operating university programs in South America, the first efforts at training teachers of agriculture for secondary schools are being initiated by the University of Arizona and Ohio State University this year.

It is, of course, during the early years of school that attitudes toward work and occupations are developed; certainly an attitude toward farming and the production of food as a most worthy contribution to the society and the economy is the critical factor in most situations. Our own FFA and 4-H Club programs stand as evidence. But, unfortunately by virtue of our own government organization nearly all our aid programs have contributed to a basic mistake. We have exported only researchers and highly specialized scientists, and have given only that kind of opportunity to virtually all the young men who have come to us from other countries. AID as an organization has had virtually no contact with primary or secondary education, to say nothing of vocational education in this country. "Visiting" students and groups go only to our colleges and universities; and, while there, usually only to the experiment stations and research plots where they see and talk to specialized Ph.D. scientists. One of the questions I had proposed in advance for the agenda of the seminar was intended to open this subject but for some reason was not picked up. That fact, in itself, might be significant with respect to attitudes.

The job of the farmer is a complicated one that cannot be spelled out in a simple list of specific skills in the fashion that we spell out the job of a machine-lathe operator. We look at "shining" examples of one-crop specialized farms, or at "contract" operations, and would like to think all agriculture operates in this fashion; which, of course, is not the case. For the most part, and especially in developing countries, the farmer is and must be a generalist, with knowledge of how to handle and feed and care for animals, with an understanding of how plants grow, with skills in operating and repairing machinery, and a basic understanding of soils and fertility. Many of these things the farm boy learns from childhood. School programs can and should built on this learning to give him "literacy" for understanding new developments; and even more importantly, develop in him, through directed learning experience, a belief and conviction that sharing responsibility for feeding the world is a worthy life for any man.

OCCUPATIONAL EDUCATION AND TRAINING FOR RURAL DEVELOPMENT

by

Delfin G. Quirolgico[1]

1. The Problem of Development

Two thirds of mankind live and work in underdeveloped rural areas that are basically oriented toward natural resources. The other third live in urban areas that are mainly oriented toward human resources and applied science technology. Rural areas often lack essential amenities for decent living and offer limited employment opportunities which consist mainly of agriculture-connected pursuits with low income rewards, in contrast to urban areas which provide diversified employment opportunities with better incomes and essential amenities. As a result, the best of the human capital and the profits from basic products are lost to urban areas. Urban problems include accommodating and providing employment for large masses of rural and unskilled workers who flock to urban centers in search of jobs, amenities, and other opportunities. Unregulated, the mass influx leads to proliferation of slums and blighted areas which depress the over-all national socioeconomic growth.

National development will be successful and long-lasting to the degree that equal emphasis of development efforts is given to the urban and the rural areas. The further growth of urban centers depends not only on access to basic inputs and markets but more importantly on the supply of highly trained workers, technicians, scientists, and various types of leaders in socioeconomic fields. To achieve the balanced rural-urban growth, the rural-to-urban flow of profits and human capital must be systematically arrested if not temporarily reversed. By ordering rural development, these underdeveloped areas may yet constitute the best prospects for more rapid national growth.

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Differential growths of rural and urban areas with the corresponding shifts in opportunities and potentials may aid the developing economy if properly planned and managed; they become liabilities and contribute to stagnation if allowed to occur as unmanaged or mismanaged social and economic phenomena. Continuing change is inevitable in a dynamic situation, so continuing adjustment is unavoidable. Thus, differential regional economic growth is an expected characteristic of the economy influenced by the accumulated effects of change-initiating factors operating in each region. Policies of in-migration matched with out-migration and of investment subsidy reciprocated with development investment applied in the right amount at the right time and place would maximize the positive and reduce the negative effects of differential growths and economic shifts.

Investment was, still is, and will be the classic key to socioeconomic development that applies equally to urban and rural development. In order for this investment to be effective in the development effort, it must constitute three foundations--investment in human capital or resources, in natural and processed resources, and in productive facilities. A nation gains when productive activities take place in those areas where net returns are highest; anything that prevents an optimal locational pattern, such as a continuing subsidy of industry or enterprise in certain locations, can dampen national socioeconomic progress. Although some localities in economic difficulties possess useful social overhead facilities and good locations and have long provided an attractive social and cultural environment, many areas are so depressed economically and culturally that efforts to maintain them are unlikely to produce long-term advantages either for the nation or for more than a small proportion of the residents. In this case the investment subsidy would be better used as a developmental investment for less developed, largely rural areas with suitable growth potentials. If, however, there are good possibilities of at least stabilizing the situation and preventing further decline, the nation can well afford to take costly measures to protect its substantial investment in such communities. The protection of investment under appropriate circumstances is as sensible an objective for the nation as for any enterprise, but so is the write-off of investment when the situation calls for it. A policy to invest in efforts to prevent distress areas and to cope with problems of adjustments would be sound to the extent that realistic and selective programs are related effectively to the constantly changing national, regional, and local situations.

The process of socioeconomic development will succeed to the degree by which the elements of productive resources, resource utilization, and sociocultural environment are activated and orchestrated. The key to this activation and orchestration is people--leaders, technicians, and workers with the proper skills and attitudes and occupational mix; without them, native physical resources, capital invested, and the growing store of production knowledge and techniques will go to naught.

Education and training are required. To be efficient and effective this education and training must be planned, systematically implemented, and continuously evaluated so as to achieve a balance of educating individuals for their human rights within the constraints that society accepts as crucial for its continuity and for the preservation of individual human rights.

2. The Nature and Aspects of Rural Development

The development of rural areas is a continuous process that starts from early stages of a traditional agricultural-based economy, through a technology-oriented agriculture economy and eventually to industrial productivity and maturity with abundance of amenities and recreational conveniences; the rural area of today may spawn the urban center of tomorrow. This rural development should be so ordered as to foresee and promote the transformation of certain sections into semi-urban centers and to create balanced rural-industrial clusters which avoid future distress from congestion and stagnation now evident in most cities of the world. These clusters would be the core of zones or poles of intensive development and would provide the necessary factors required to attract people and foster a balanced socioeconomic growth of the area. In order for rural development to succeed, adequate efforts must be emphasized at the proper time, and projects for the purpose should have high priority and be in suitable combination and proper sequence. A multi-sectoral approach is crucial, but for such an approach to be effective, adequate and timely communication, cooperation, and coordination must be secured among government and private organizations and individuals concerned with each sectoral project. Benchmarks in terms of resource potential such as human and locational factors must be established and defined, and certain limiting factors must be identified. The direction and process of best possible growth must be estimated. On the basis of these, selected realistic objectives are established and then a vigorously implemented program must be mounted. A key factor may involve a policy decision to concentrate human and financial resources in an easily managed geographic area so as to ensure early positive impact. Experience gained from such a pilot approach can be spread to other equally viable geographic areas, and eventually blanket the whole country with purposive, effective development programs.

It is generally believed that efficient agriculture serves as the well-spring of rural progress. To ensure the development of agriculture and other sectors of the rural economy, balanced efforts should be directed to programs aimed at analyzing and assessing prospects for agricultural growth and markets, improving and expanding transportation and communications systems, providing better housing and health services, establishing and improving adequate education and training facilities, organizing and upgrading administrative and other essential services, and securing and stimulating investment capital to finance the programs, taking into account necessary priorities. In brief, the determinants for the agricultural development of a particular country must be defined, and activities to maximize the effectiveness of these determinants must be pursued. These activities, which are national, regional, local, and institutional and individual responsibilities, include agricultural planning and decision making, land use and colonization, agricultural education and training, increasing application of technology to agriculture, determining marketing policy and pricing, land reform, providing farm credits, and increasing participation of rural families in local and national community affairs. The activities are important in that agricultural people among others will prosper in their pursuits if they are given the necessary incentives that will guarantee reasonable profits from their efforts, assured ready access to facilities necessary for increasing their productive efficiency, and allowed to participate in arriving at decisions affecting them. The experiences of two countries --the Republic of China (Taiwan) and the Philippines--are reviewed to show how certain elements and activities determine the success or failure of the agricultural development.

a. Taiwan's Agricultural Miracle

Taiwan's progress in agriculture has been so phenomenal that foreign observers have called the country "the island of agricultural miracles." Besides keeping Taiwan well fed, agriculture has played a significant role in the island's industrial development and in expanding the national economy. The country's progress has attracted the attention of Asian, African, and Latin American countries so that third-country training, study, and observation have been arranged in Taiwan for nationals from the three continents. Also, farm demonstration teams from Taiwan, as a part of the government's recently initiated bilateral aid to other countries, have been sent to some fifty African, Asian, and Latin American nations to help them grow rice and other crops. Many factors are involved in Taiwan's "agricultural miracle" and a lot of credit is given to the Joint Commission for Rural Reconstruction (JCRR) as the driving force behind the agricultural development since 1949. By providing technical and some financial assistance, JCRR has been able to stimulate improvements in agricultural policies and implementation, to motivate difficult projects, and to generate a spirit of self-help among local agencies. Most of the credit for the success in the rapid agricultural development has been attributed to Government and private agencies and organizations besides the JCRR. These include schools and colleges of agriculture, the Department of Agriculture and Forestry, the Food Bureau, the Water Conservancy Bureau, the Health Department, county governments, township offices, farmers' and fishermen's associations, and farm irrigation associations, the tea and pineapple corporations. To this list should be added the extensive network of primary and secondary schools that contributed to making Taiwan among the few nations in Asia with the highest literacy rates. In fact, the credit belongs to the people, the farmers, technicians, administrators, and consumers alike.

The following elements have been identified as the basic determinants of Taiwan's agricultural miracle: land reform, education and training, technology, agricultural marketing and pricing, farmer's cooperatives, transportation facilities, tools and equipment, industrial progress, credit facilities, research and pilot programs, agricultural policy and planning, land use and colonization, rural health services, and peace and security. An analysis of why these elements served as determinants of agricultural development in Taiwan is presented in the following paragraphs.

Land Reform or the "Land-to-the-Tiller" Program. The land reform was achieved by the Government through a three-phase five-year program initiated in 1949 and completed in 1953. The old tenancy system provided good life for the landlords but led to growing unrest and instability arising from tenant-landlord conflicts in the sharing of the profits from production. The implementation of the "Land-to-the-Tiller" program in the form of rent reduction, sale of public lands to tenants and bona-fide farmers, purchase of landlords' lands and resale to farmer families, and equitable compensation of former land owners, provided the sinews for the successful agricultural, later industrial and trade, development of Taiwan. The immediate results were marked increase in production per acre, 47 per cent increase for rice alone in four years, and tenant income rising 81 per cent in four years. The increased income was used for further farm improvements and to raise the standard of living. Rural prosperity was evident throughout the country from 1951 onwards.

Education and Training. When the land reform was initiated, the literacy rate was already high--in excess of 50 per cent; vocational education constituted a significant part of the secondary education program, with about 30 per cent of vocational students taking vocational agriculture and home economics; the elementary as well as the general secondary curriculum contained significant elements of agricultural knowledge. With these educational achievements which included the rural population, the field for sowing new and additional scientific knowledge and skills in agricultural technology was ready and rich. Also, the country had a high proportion of Chinese agricultural scientists educated abroad. However, the gap between the grass roots farmer and the agricultural scientist was too great, and the flow of technological knowledge through the gap uncertain and indifferent. Technicians and teachers who spoke the language of the grass roots farmer and understood the scientific knowledge and technology that the scientists could offer were needed in great numbers to ensure that farmers increasingly applied needed scientific knowledge and technology in agriculture. For this purpose, the JCRR supported a number of specially designed projects to train directors and managers of agricultural units and farmers' associations and to improve the professional ability of staff or these organizations. By 1965, 10,000 chiefs of agricultural units and 2,000 directors of farmers' associations were trained. Also, a permanent training school for agricultural technicians and teachers was established in 1952 by the Provincial Farmers Association, and by 1963, 7,300 technicians and teachers were trained. In the future, partly due to the success attained through agricultural technician and teacher training, the Government plans to pursue with greater vigor elementary education with enriched agricultural knowledge content, vocational agricultural education in secondary and post-secondary schools, and college-level agricultural education in Taiwan and overseas. Obviously, education is Taiwan's biggest business, and from education the Republic is confident of receiving the impetus to its rapid economic prosperity and constructive association in the modern world of science and industry.

Technology. The difference between primitive agriculture or subsistence farming and progressive agriculture lies in the agricultural technology available and effectively applied to the agricultural processes. The farmers of Taiwan have access to the latest agricultural technology available, such as use of fertilizer, irrigation, plant modification and breeding, rats and insect control, etc., the results of research in other countries, particularly the United States, and in the country itself. The Chinese agricultural scientists also added to agricultural technology applicable to conditions in Taiwan in the form of new agricultural implements that are both economical and practical. The application of agricultural technology was gradual, facilitated by technicians who had close affinity to the farm. The dosage of agricultural technology applied was at the right amount, determined by the farmer-technicians who knew the characteristics and potentials of the technology being applied. More and more, the farmers of Taiwan have adopted as part of their everyday know-how seed selection, sowing and transplanting techniques, insect detection and control, proper application of the right amount and kind of fertilizer, making of compost, use of small power tillers and weeding machines, crossbreeding, conservation measures such as rotational flooding and irrigation, crop diversification and rotation, crop grading and pricing, and farm management. The growing application of increasing amounts of agricultural technology was the result of education and training, research and demonstration, and farm extension in the right mix, sequence, timing, and intensity.

Farmers' Organizations. Under a new Farmers' Association Law in 1952, agricultural cooperatives, farmers' associations, and rural community organizations were consolidated into a single federated system of farmers' associations to serve the whole of Taiwan. The reorganized Farmers' Association undertakes agricultural advisory and extension services, agricultural training of adult farmers, collects and processes rice, handles the purchase and distribution of fertilizers, operates cooperative stores, maintains warehouses and storage areas, extends credit at low interest rates, provides banking facilities, and trains management personnel for the agricultural units and the farmers' associations throughout the country. Under close regulation and closer adherence to principles of agricultural cooperation and farmer-member control, the Farmers' Associations were able to ensure that the farmers and not vested interests benefited from their increased productivity.

Agricultural Marketing and Pricing. In order that a fair share of the profits would be allocated among the producers and distributors on the one hand and the consumers on the other hand, with the objective of (a) providing incentives to the producers, (b) developing efficient marketing and pricing mechanisms, and (c) developing new markets and expanding existing markets, the Government in cooperation with representatives of producers and marketing organizations undertook the promotion and regulation of marketing and pricing. The Government measures in this regard were so successful that domestic and international markets were found at competitive prices for the agricultural products of the country. An example of the effect of institutional changes in marketing and pricing on increase of production and farmers' income is the boom in bananas. New measures governing the export of bananas and aimed at promoting an increase in production and the welfare of the growers were enforced, a new and more reasonable marketing and quota system was introduced, and exports were made on a planned basis. The banana purchase price was increased, the farmers' income increased overnight, and farmers began to grow more and better bananas.

Transportation Facilities. Taiwan's transportation system and facilities were fairly good before World War II and are now much improved and expanded. Numerous two-, three-, and four-wheeled vehicles crisscross the island and link every hamlet with the towns and cities. People and products are moved readily and promptly. With these facilities, even small-scale farmers easily transport their produce where it would command the best price and do not get frustrated or suffer losses by delays or lack of transportation; the people and products go places at any time.

Tools, Equipment, and Supplies. The essential tools, equipment, and supplies needed by the farmers are available in the right kind and quantity and at the right time when required by the farmers, thus avoiding inconvenience, delays, or losses. Other essential services to ensure the timely acquisition, operation, and maintenance of implements and supplies are accessible.

Industrial Progress. The accelerating economic maturation triggered by the rapid industrial development, with its backbone of the spectacular agricultural growth, has in turn accelerated agricultural development. The tools, equipment, supplies, and other facilities needed by farmers to facilitate their increased production, to expedite marketing, and to further improve their farming activities, are being made in increasing quantity and quality at decreasing costs to the farmers due to the success of the industrial manufacturing activities. Also, the successful industrial processing, packaging, and distributing of surplus agricultural products have increased the incomes of farmers, which served to further stimulate additional efforts and initiative in increasing their productivity.

Research and Pilot Programs. Innovative research and pilot programs that are aimed at increasing the income of the rural population, diversifying agricultural production, and promoting agricultural export were undertaken and continue to be pursued with vigor. Illustrative of these innovative activities is mushroom growing, which was once considered an insignificant activity but has now become a prosperous enterprise, resulting in a foreign exchange earning of US$ 16,200,000 in 1963 against almost no export earnings five years before. In 1963, 50,000 farm families were engaged in this culture with an additional 25,000 persons employed in collecting, canning, and selling mushrooms.

Credit Facilities. Credit facilities consisting of supervised credit, agricultural banks, cooperative credit services, private lenders, and physical loans are all available to farmers in Taiwan and, in varying degrees, utilized effectively by most farmers. A scheme based on the success of the farmer's crops made available the necessary credit to the farmers at the time needed to ensure timely planting, irrigating, fertilizing, or harvesting, and also insured them against extraordinary crop losses or failures.

Rural Health Services. In 1950, rural Taiwan suffered from lack of health facilities, and many working days of farmers were lost--most often on the days when they should be preparing the fields and when they should be planting. Rural incomes suffered from inability of farmers to be up and working when they should. The Government through JCRR, cooperating with local communities, improved existing health stations to minimum standards, and established new stations, so that in 1964 every community had rural health services operating at least at minimum standards. With these facilities, healthy and strong farmers were ensured.

Land Use and Colonization. The special features of Taiwan's agriculture, supported by many elements of policies and facilities, are (a) small-scale and intensive farming, now mostly with manual labor but with an increasing use of micromechanisms as sources of power, (b) reconstitution of land, (c) crop and land-use changes, (d) crop diversification, and (e) multiple cropping. The over-all result was more and steady income for the farmers and improvement of both the rural and national economy. The land colonization program was a proven success, through the sale of public lands described under land reform. The land colonization scheme of Taiwan had three characteristics: (a) only bona fide farmers or those who would now be farmers could buy and own the public farm land, (b) the public land sale was a means to retain the farmers on the land, and (c) the land colonization was used not only to reduce the exodus to urban occupations, but also to induce the return from urban to rural occupations, preventing the inordinate swelling of urban population with corresponding ills and problems.

Agricultural Policy and Planning. The primordial aims of the Government's agricultural policy and planning are: (a) promoting the development of agricultural resources of Taiwan, (b) boosting agricultural production, and (c) improving the farm standard of living. The cornerstones of these aims are: (a) helping tenant farmers acquire ownership of land without increasing their financial burden, implementing the land-to-the-tiller program, (b) protecting the interests of the landlords, and (c) converting land holdings into industrial holdings. The agricultural development was planned by the national government and jointly implemented with local governments and organizations. Implementation was characterized by steady, balanced efforts and continuity of policies and support; each project in the plan was followed to successful conclusion during the past 17 years since the agricultural development of Taiwan was undertaken.

Peace and Security. A stable Government that planned, implemented, and vigorously supported the agricultural development, ensured peace and security in the island. With this peace and security, the farmers had uninterrupted opportunity to adopt agricultural improvements, their initiative was enhanced, and their rewards continued. The confidence of the people in the Government further enhanced peace and security.

b. Philippine Development Efforts in Agriculture

The Philippine experience indicates that the 14 elements that determined the degree of agricultural development in Taiwan were also relevant. An additional element--community development--was a useful means of awakening the awareness and interest of the rural people in the development programs of the Government, including those aimed at their betterment and participation in grass roots level activities for improved rural production and living. It is now seen that although progress was attained, the quality and quantity was not commensurate with the potentials and requirements of the nation. It is evident that the measures have not fully contributed to (a) changing the relationships between costs and returns in individual farm enterprises, (b) revising and improving the nature of individual farms, (c) reforming the behavior of farmers, and (d) modifying the production processes of agriculture. Until the people find the measures that would identify and implement the appropriate mix, appropriate intensity, and appropriate timing of the various determinants of agricultural development, the developmental process will remain slow and the progress far from satisfactory. The search for that proper mix, intensity, and timing continues. There is evidence that the elusive formula is within grasp.

3. Implications of the Nature of Rural Development: Approaches and Schemes

The experiences of China (Taiwan) and the Philippines described above indicate that for agriculture to move to higher levels of productivity, it is not sufficient to merely cultivate land and tend livestock, it is equally necessary to build roads, conduct and apply research, improve laws and government operations, adopt reasonable price and marketing policies, link agriculture with industrialization, and above all to educate and train the people effectively in their chosen roles. The major question to be resolved in educating and training the people for socioeconomic development is the proper mix (general primary and secondary, vocational, and higher education) in relation to short- and long-range development plans and the corresponding strategies to ensure the proper mix.

Different leaders, e.g., economists, manpower experts, and socioeconomic experts, see the task of rural and/or agricultural development from different angles and suggest different solutions reflecting their expertise. The economist is concerned with the productivity and viability of the individual farm and with the nature of the wider economy as it affects agriculture or is affected by it. His approach to achieving greater productivity is providing the farmer with suitable equipment and supplies including better seed, inducing farmers to adopt tested and improved practices, ensuring farmers and products. His program emphasizes the effective use of scarce land resources. The manpower expert is concerned with the productivity, efficiency, and effectiveness of the farmer, and with the effectiveness and competence of innovators and technologists in raising the productivity of the farmer. His approach is preparing the youth for entry into specific agricultural occupations and upgrading the skills of the practicing farmer. His program emphasizes the effective use of scarce managerial and technical personnel. The socioeconomic expert is concerned with the motivations on the farmer's part in making rational decisions and in undertaking crucial actions affecting his role as producer of prime commodities, and with the incentives and services which society must provide for the greater effectiveness of the farmer as a producer and as a member of that society. His approach is to educate the farmer as an entrepreneur and as a full man and to equip him with capacities for motivation and self-direction, and to educate the rest of society in recognizing and in providing the incentives for the maximum efficiency and effectiveness of the farmer. His program emphasizes attitudinal and decision-making development and measures to overcome resistance to change.

Each of the approaches taken separately is inadequate. A composite approach would provide materials, facilities, and services to maximize the endeavors of agricultural production, educate all members of society in varying degrees of complexity of skills and attitudes as a chosen occupation requires, and train agricultural practitioners in the arts and techniques that will enable them to be more effective producers and multipliers. In determining occupational education and training schemes in line with this composite approach, three policy decisions appear relevant, as follows: (a) Education and training of manpower for agricultural and rural development must emphasize equally the proper preparation of youth and adults for entry into agricultural occupations and the upgrading of those engaged in such occupations. (b) Education and training should help the total national effort in ensuring a balanced supply of farmers, agricultural technicians, farmer-entrepreneurs, agricultural scientists and researchers, in sufficient quantity and quality. (c) Preference should be given to such agricultural education programs and levels as will reach the greatest number, will ensure that the rural people acquire favorable attitudes and specific productive farming skills, and will provide equal opportunity for female and male workers to secure balanced farming skills.

Although agriculture has the most immediate and visible impact on rural people and living, rural development is more than agricultural development. The activities of lawmakers, educators, engineers, merchants, manufacturers, social workers, and every citizen who participates in electing public officials or in influencing the laws of the country, affect and are affected by the activities of the farmers and farm families. This interactive relatedness of activities of the population has educational implications for the whole society as well as for the agricultural sector and must be translated into approaches and schemes of education and training. This leads to the problem of defining the manpower needs for rural development on which schemes for occupational education and training may be designed.

4. Defining Manpower Needs for Rural Development

The task of determining the number and categories of trained people for rural development is extremely difficult, particularly for the agricultural and related pursuits. The reasons for this difficulty are (a) the lack of agreement on what constitutes the functional categories of occupations in agriculture and related pursuits, and (b) the nature of the agricultural enterprise as compared to the industrial enterprise. The industrial enterprise depends on, and leads to, precise controls of operations, some of which are repetitive, and division of specialized tasks. The agricultural enterprise largely consists of and depends on a multiple of biological and natural phenomena over which man has limited control, if any at all. The farmer must have specific farming skills, knowledge, and attitudes, and--most important of all--he must have managerial and entrepreneurial skills which will enable him to make decisions on the proper combination of natural and created resources, timing, and risk-taking to make his farm enterprise prosper. These decisions are dictated by not only the operation of the market mechanisms but more so by the biological and natural phenomena of weather, rain, and sun largely beyond his control. This difficulty influences the determination of the number, category, and quality of agricultural personnel and the educational schemes, programs, and content.

The identification and classification of rural development personnel concerns four groups of society involved in the over-all process of agricultural and rural development. These groups are the producers, the catalyzers or multipliers, the supporting technicians, and the consumers. Among the producers are farmer-entrepreneurs, farmers (leaseholder, tenant, or owner), farm enterprise managers, and farm employees. The specifications for this group are secured by surveys which can coincide with population census and be adjusted between census periods by sampling surveys. As the agricultural enterprises slowly emerge from subsistence levels, the numbers and quality of skills required rise sharply, and as further progress in applying technology is attained, the numbers first stabilize and later decline, but the skills and knowledge required become more sophisticated. The education of this group is broad and functional and covers the full range of the agricultural enterprise, perhaps to a lesser degree with the farm employee. The emphasis, except for the farm employees, is on farm management and decision-making relative to utilization of natural resources. The levels of education range from the secondary to university, depending on the stage of educational development of the developing country.

Among the catalyzers or multipliers are lawmakers at various levels, agricultural policy-makers, extension service agents, vocational/technical teachers, cooperative credit administrators, agricultural science researchers, and agricultural technology innovators. The methods of calculating numbers used in the industrial sector are at the present state of the art not applicable to the agricultural sector, although with modifications certain of these methods may be used for certain fields of this group. It is, however, essential to have at least the general order of magnitude for each classification in this group as a basis in designing the programs for the preparation and/or upgrading of personnel. As an example, FAO estimates one extension agent or supervisor to every 1,000 farm families, others estimate one to 200, and a few (Hartzog and Barraclough) estimate one to 50-60 farm families. Each of these ratios may be appropriate depending on the level of advancement in the application of science and technology to agriculture and the pace with which change is to be effected. As to vocational/technical teachers, the teacher-student ratio of 1 to 50 might be acceptable. In any case, in the absence of reliable data, a two-step process to calculate the number required of each classification may be used. First, the benchmarks for these occupations at the current stage of a country's development are established; second, the numbers and qualitative requirements established through benchmarks are adjusted by policy to the goods set by competent authority in the country. The education of this group is quite specialized, with emphasis on their specific functions as transmitters of knowledge and stimulators of change.

The occupational specialties included under supporting technicians are agricultural machinery and supplies salesmen, agricultural equipment service shop operators, fertilizer dealers, farm credit evaluators, agricultural produce distributors, rural health personnel, irrigation technicians, transportation technicians, social workers, etc. Calculations to determine requirements might utilize with some adjustments the methods evolved for the industrial sector. Their education is quite specialized, with emphasis on their specific functions. The level of training ranges from non-school through secondary to some post-secondary schooling.

Included under the consumer group are the food and other agricultural produce processors, farm produce purchasers (housewives, marketing men, etc.), and other consumers. Except the purchasers for processing and distributing enterprises, the numbers of consumers can be drawn from the population census. The calculation of the number of purchasers may use methods used for the industrial sector. Their education ranges from general to special education and from primary to college level.

5. Planning the Programs for Education and Training of Rural Development Personnel

The system of education and training for rural development, in order to relate closely with the over-all developmental situation and the possibilities of the country, should be designed with provisions for continuous adjustments to the changing cultural milieu, social situations, and economic growth and goals. Background information is required on the physical and human resources available, to suggest what is possible and what limitations will be encountered. This information serves to remind the educational planner not to set his sights so high as to be meaningless to the country, even if it was meaningful to another country. It is, however, not indispensable to wait for a complete and precise inventory of these resources; it is sufficient to have as much information as is possible and then to continue enriching such information.

Equally important is information about economic goals and trends. Economic goals serve to focus the need for strategic manpower to carry out development plans and to direct more attention to the articulation between education and development plans. Goals quantified from qualitative dreams which point the direction of resources and efforts for the sustained economic growth of the country, represent the upper limits of the range of what may be attained, or the maximum of what should be attained with increased motivation and effort. Trends of growth showing past achievements and current performance provide bases for determining what could be attained and the magnitude of expected growth that can realistically be sustained.

Social forces that influence economic growth must also be identified and taken into account in designing the educational plan for rural development. Socio-cultural patterns such as general aversion to labor and resistance to innovation, and demographic characteristics such as high rate of population growth and low participation rate in the labor force hamper economic growth. A high rate of literacy may provide a social climate conducive to economic efforts.

The nature, structure, problems, and contributions to development of the existing educational programs must be assessed so as to determine the strengths which should be continued, the deficiencies which must be corrected, the inadequacies which must be strengthened and expanded, and the gaps which must be filled. The specific areas that must be assessed are educational objectives and policies, educational structure and curricula, financing and business management, instruction and other services, educational institutions at primary, secondary, and post-secondary levels, enrollments and outputs, staffing and personnel policies and practices, training of adults and out-of-school youth.

Another requisite to educational design is the assessment of manpower needs at certain time periods. The determination of the manpower required as per classification presented in Part 4 above may be based on actual rural employment, national and rural income, economic and agricultural growth targets, domestic investments in the whole economy and in agriculture, and demographic growth. Calculations should account for the filling of existing needs, meeting envisaged expansion of employment, and replenishment of losses due to retirement, transfer, and other causes. When the manpower needs have been determined, it is necessary to ascertain what proportion requires the various levels and types of education and training. Some occupations require minimal education, others require increasingly higher educational exposure, and the rest call for intensive but intermittent training of short durations. Some occupations are quite homogeneous with respect to educational qualifications required, such as the agricultural technologists and scientists that normally call for college or university education. In other occupations it is quite a task to determine what proportion of agricultural administrators and officials, farm managers, and overseers require college education; what proportion of farm technicians and other technical personnel require subuniversity or full-fledged university education. In the case of farm workers, tenants, leaseholders, and owner-farmers, what proportions must have secondary vocational schooling, general secondary schooling, primary education, adult on-the-job or accelerated vocational training? The answers to these questions are crucial to the design and the priorities of education for rural development. In the absence of specific answers, it might be necessary to assume initially that unskilled and semi-skilled farm workers require only primary education; tenants, leaseholders, owner-farmers, and skilled farm workers require secondary vocational schooling; agricultural technicians, extension agents, and nonprofessional farm directors and managers require junior college education; and agricultural technologists, scientists, administrators, and policy-planners require college and/or university education.

The manpower requirements approach, which attempts to determine the future occupational structure for rural development in a certain period of time, is essential in designing the long-range educational plan to supply the number and quality of personnel at the required time. This approach is, however, insufficient for a sound long-range educational plan; a cultural approach is equally necessary. The cultural approach involves determining how much education is necessary for the citizenry as a whole to have, without attempting to specify whether the necessity is dictated by a desire to promote individual fulfillment, more rapid economic growth, political and social stability, or any other objectives for which education may be conceived to be an instrument or means. The cultural approach is necessary because economic growth is just one--even if the most pressing in newly developing countries--of the objectives of human society, and no one should maintain that the sole function of education is to contribute to that end.

Three basic needs of human society which must be met if people are to be effective citizens and workers are the need (a) to maintain and develop specialized and technological skills, (b) to maintain and develop individual powers of wisdom and good judgment in determining internal affairs and in understanding external relations, and (c) for every individual to develop his capacities to the fullest extent as a human being. Technological knowledge and skills are not passed on from father to son as inherited characteristics. Individuals must consciously prepare through organized education for their roles in society. Policy decisions and day-to-day operations of governments are delegated to those chosen for government posts, but decision on major issues ultimately rests in the collective exercise of powers of individual citizens. Men carry on occupations, develop occupational and professional skills in order to live; a strong society is maintained not as an end in itself but to provide the conditions for maximum individual development; man does not live for the state nor does he live for the profession or occupation. But the individual's occupation, his citizenship rights and responsibilities, and his personal development as a human being are interrelated and not compartments of his life. To this end, individuals must be purposively developed to exercise their powers as citizens with responsibility and good judgment. These beliefs undergird any educational design for rural and agricultural development.

6. The Strategies and Priorities of Education and Training for Rural Development

These ideas on the design of education for rural development suggest certain strategies of education and training. Innovative agricultural and rural training programs of less than university level for both school-age and out-of-school youths and adults are imperative in developing countries. Some of these educational programs, short-range as well as long-range, are particularly suited for in-school youth, and others are extremely useful to out-of-school youth and adults. In proper combination and with appropriate coordination, they could be effective in meeting the needs of youth and adults as well as the socioeconomic requirements in a particular country. Among the long-range programs are: (a) agricultural and rural education and training at the primary, middle, and upper secondary schools, junior and senior colleges and undergraduate university levels; (b) agricultural research at research institutes, agricultural experiment stations, and college faculties; (c) demonstrations of pilot farms and experimental stations; and (d) teacher, administrator, agricultural scientists, and researcher training. Among the short-range programs are: (a) accelerated training and/or short intensive technical in-service courses at pilot farms, demonstration centers, in agricultural schools and colleges; (b) seminars and workshops at agricultural and community schools; (c) work-oriented literacy programs, including the possible if limited use of radio, TV, correspondence and programmed instruction; (d) organized rural youth clubs; (e) rural community and youth training centers; (f) national service programs; (g) international or overseas student exchange; and (h) voluntary or contractual service of foreign technicians and experts. The list is not exhaustive, it is rather illustrative of what might be worth exploring for adaptation and support in a particular country, as the experiences of certain developing countries in some of these strategies point to exciting and promising results. It also points out that excessive reliance on research with short-range and long-range vocational/technical rural and agricultural education programs. Some of the personnel required to propell rural development efforts could very well be educated and trained in non-agricultural education programs.

The question of support and priorities for these strategies is one that the leaders and people of a country must decide. The contribution of citizen-workers accrues to the nation as a whole, thus responsibility for support lies with the national government. However, the immediate beneficiaries of individual productiveness are the local governments, communities, and institutions, thus responsibility for the programs must also be shared by them. The ability to maintain a system of agricultural education and training depends on such factors as (a) ability to provide support without being compelled to shift funds intended for other equally crucial development purposes, (b) adoption of methods to reduce cost without impairing quality, (c) investment priorities in the over-all development plan and the role expected of the system, (d) decision to place investment in the system at par with that of capital goods and physical resources, (e) level of cultural attainment of the general population and the premium placed on intellectual capabilities and individual performance, and (f) amount of material aid and technical assistance that may be secured from external sources. The priority for the system depends on the amount of resources available and the over-all development scheme adopted by a country. It involves ascertaining the appropriate levels of educational expenditure in the light of social and economic objectives and establishing the optimal distribution of any given amount among various levels and categories of education. The broad social objectives require that all citizens, irrespective of functions, should be guaranteed basic general education, at the same time assuring that employment opportunities to individuals and the production requirements of the economy should be fulfilled. To this end, it is essential that the distribution of general primary and secondary, vocational, and university graduates and the timing of their availability by skills and abilities should relate to the distribution of the job requirements and opportunities if a system of occupational education and training is to propell rural development.

SOME BACKGROUND COMMENTS TO A DISCUSSION OF OCCUPATIONAL EDUCATION AND TRAINING FOR THE DEVELOPMENT OF AGRICULTURE

by

Peter Hopcraft

The Role of Agriculture

Perhaps the most intransigent problem of development, and one that has consistently defied easy and obvious solution, is the problem of agricultural growth and the development of the rural sector. I shall not preach to (what I hope are) the already converted about the critical role of agricultural development if an economy is ever to industrailize (in the broader meaning of that word). There is now a strong theoretical and empirical case for assuming that the development process requires, and in large measure consists of, a far-reaching and radical transformation of agriculture.

The Employment Problem

A parallel and unsolved problem in the currently less developed countries is employment. At the margin there is generally an extremely high capital/labor ratio in the non-agricultural industry sector. It costs a great deal to create an additional manufacturing job, and the speed at which these jobs are being created is generally not encouraging. In the meantime, while the over-all labor force is growing at unprecedented rates, the sheer size of the agricultural (relative to the non-agricultural) labor force dictates that the number of people employed, for lack of alternative, in the agricultural sector must increase for many years to come.

I shall not dwell on the demographic arithmetic (see Dovering 1959, Etherington 1965, Johnston 1966), but the crucial variables are obviously the rate of growth of non-agricultural employment, the rate of growth of the total labor force, and the percentage of the labor force currently employed in agriculture. Assume, for instance, that 80% of the labor force is currently in agriculture. If the rate of growth of the non-agricultural labor force is 3% and the rate of growth of the total labor force is 1% (figures that might roughly characterize the currently more developed countries in their early stages), the point at which the farm labor force stops increasing and begins to decline can be expected in about 29 years. The reason is that the 3% growth rate is operating on a nonfarm labor force that is only 20% of the total.

If one uses more current figures, the results are as unnerving as any calculations involving projections on the basis of existing population growth rates. Assuming the same predominantly rural economy and the same rate of growth of the non-agricultural labor force, but an overall labor force growth rate of 2%, the number of people not employed in the "modern" sector will increase for the next 125 years!

Population growth rates of higher than 2% are now common in low-income countries, and very few of these countries are absorbing large numbers into industry. There is no avoiding the fact that the number of people employed in agriculture will be increasing for a great many years to come.[1] In some countries there is not even a percentage decline in the self-employment and agriculture sector.

The two points made so far are, first, that there is a desperate need for innovation and increased productivity in agriculture if development is to succeed in these countries, and secondly, regardless of what training they are given, and whether they like it or not, the vast majority of the labor force will have to be employed in agricultural pursuits or else be redundant.

Productive Employment in Agriculture

A third point completes this introductory picture: Given a range of intensifying inputs of a labor-complementing sort, agriculture is generally in a position to absorb productively, and indeed requires, greatly increased quantities of labor. Biological, chemical, and institutional innovations and inputs generally shift the production function in such a way as quite radically to increase the demand for labor. For example, Mellor finds that labor utilization per acre in the Kinki district, Japan, is four times what it is in West Bengal, India; this cannot be divorced from the fact that in the Japanese case the input of fertilizer per acre is ten times as great. Mellor states: "Where agricultural development through technological change occurs without major substitutions of capital for labor, then the labor input per acre can be expected to rise very substantially" (Mellor 1966:160).

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[1] The implicit case for labor intensive industry has to be tempered by considerations of the productivity of capital. Where capital intensive industries yield a substantially higher return to capital, the case for allocating capital to them may be stronger still. Furthermore, to pin one's hopes for solving the vast unemployment problem on arbitrary requirements for more labor intensive techniques in the tiny manufacturing sector is simply ridiculous. In most early-stage countries, it would hardly scratch the surface of the problem. Perhaps the most that policy makers can do is to discourage market distortions that put up the price of labor and result in the excessive use of capital.

The Role of Education

This paper will argue that if agriculture is to be intensified and the productivity of the rural areas increased, educational inputs are among the most crucial. The fact that these inputs will be totally impotent without complementary factors will be brought out later in a different context.

We have all seen remarkable developments take place without any educational efforts being made; i.e., the skill and knowledge factors have not been limiting, or have been acquired by other means. New markets, for instance, have stimulated rapid growth. Similarly, we have seen buckets of high-priced agricultural education poured down the drain without any signs of development, particularly at a time when there are multiple employment opportunities outside of agriculture for anyone who can so much as read and write. Even so, a magico-religious concept of the material world, illiteracy, and entrenched traditionalism are generally not associated with innovative, scientific farming. The burden of Professor Shultz's argument is that traditional factors and technologies are not the basis for the type of agricultural growth that is now required, and that the new technologies and new factors of production that must be the basis for growth in agriculture require fresh knowledge and fresh skills embodied in farmers, and fresh sources of information streams to them (Heady 1961).

Two characteristics of smallholder agriculture have a major bearing on the educational system. The first is the totally decentralized nature of decision making. For both biological and institutional reasons, decision making cannot be centralized as it can in most industries. A procedure and a combination of inputs that will be optimal for one ecological environment will, for that very reason, be suboptimal for a different environment. Efforts to control farmers centrally, like factory workers, have almost universally resulted in a disastrous decline in the painstaking responsible care that is the essence of successful farming. Factors are combined and production decisions are made by a mass of more or less isolated individuals.

The second characteristic, related to the first, is the extreme complexity of the decision making. The Massachusetts Institute of

Technology conference on agricultural development has prepared an imposing list of physical input factors, economic factors, organizational factors, socio-psycho-cultural factors, and knowledge factors that must enter the calculus of the farmers he allocates his resources. The idea that anyone with enough muscle can farm successfully only carries weight among those who have never analyzed the range of alternatives facing the farmer and the variables that he must consider. Jon Moris writes: "The peasant farmer must constantly re-evaluate his choice in the face of multiple opportunities. The complexity lies in the decisions required, not in the dexterity of crop operations (which are individually very simple); the peasant farmer lives by his wits, not his hands" (Moris 1967).

The literature is replete with the complaints of economists and administrators who accuse the farmer of culture bound irrationality for not adopting the latest panacean recommendation, only to find that the boot was on the other foot, and the farmer, on the basis of a more complete view of the implications of the recommendation, had shrewdly rejected it as unprofitable.

The M.I.T. report states:

> The phenomenon of interactions is brought into sharp focus by the decision-making ability and managerial skill required at the place where production occurs--the individual farm. To talk about production inputs and package programs in aggregative terms is useful in planning national programs and goals, but their effects on production are determined by the way in which the individual farmer is able to put all the technologies together on his farm. On each farm the particular "mix" may represent a unique combination of all the components of a complex mosaic. The ultimate effectiveness of any program depends on the ability of farmers to make sound decisions based on an understanding of the alternatives open to them and an appraisal of their consequences (Hapgood and Millikan 1965).

In view of these characteristics it is clear that the problem of the development of peasant agriculture cannot be handled by centralized decisions or massive injections of physical capital. It must be handled by reaching the individual production units with a range of new inputs, including the information and knowledge needed to transform their production systems.

The Educational System

Following Professor Staley and others, I shall divide this discussion of educative services for the rural sector into those that would best be performed by the formal schooling system and those that would better be the task of non-school institutions. In allocating substantial proportions of their very limited resources to educational activities, a number of governments are now beginning to ask some penetrating and pertinent questions in this area.

First of all, some background to the educational system as it currently exists in a number of the less developed countries: In the early stages of modern institution-building in these countries, people with any form of education were snapped up and given a job outside of the traditional sector. The shortage of personnel for government service, administration, the professions, etc., resulted in enormous returns to traditional forms of elitist education for those lucky few who could get it. The predictable result has been intense political pressure for the expansion of this type of education. "Qualifications" are at a premium, and rationally so. It is performance on the examination that determines whether or not a student qualifies for vastly increased income and status. To expect him (as some appear to do) to de-emphasize examination results in favor of the acquisition of other types of useful knowledge in these circumstances is to look for economically irrational behavior.

The problem is that educational systems have now become capable of expanding the numbers of educated people far faster than the tiny "modern sector" is able to expand the number of jobs for them. The result is a rather rapid shift from a situation of scarcity to one of glut. This shift nevertheless goes unrecognized by both the education system and its clientele. The expectations, created by the happy experience of those who received their education at a time of scarcity and were rocketed to the top, die hard. In the meantime, policy makers rationalize their response to the political pressure for more and more of the same sort of education by quoting studies that show spectacular social returns to education, without specifying the type of education or the concurrent economic factors which might determine the nature of the demand for educated people.

The result is a situation where the prime motivation for education is the drive to acquire some sort of certificate that will enable its holder to get out of the rural environment and into wage employment. In the meantime, only a small percentage of the new entrants to the labor force will secure such employment. The rest (and I'm not talking about the school dunces; I'm talking about the majority of school leavers) must involve themselves with some phase of agriculture, a task for which neither their schooling nor their aspirations has prepared them. The implicit assumption that jobs are created by educating people for them, and that if everyone had a nice education, everyone would have a nice comfortable job with a car, lacks supporting evidence.

And so we have a paradoxical situation repeated in country after country. New attitudes, knowledge, and skills are widely regarded as among the most crucial requirements for increased rural productivity; and yet the educational system which should be providing those factors is accused instead (and often rightly) of denuding the agricultural sector of its brainpower and muscle power and flooding the cities with people at a rate that cannot possibly be absorbed by the growth of city jobs.

This is not the place for a discussion of the personal tragedy or social dangers that these frustrated migrants represent. Suffice it to say that the returns to the wrong sort of educational investment at the wrong time may be zero and may indeed be negative. The proliferation of urban services and non-productive urban "posts" can make major inroads into scarce and high-priced resources. The costs of continuing urban disturbances and radical movements can virtually defy analysis.

Let me repeat: schooling, which could and should be the way to equip the individual to handle his economic and ecological environment productively, has frequently become a means of alienating him from his environment. Very seldom has it been the purveyor to the farmer of the requisite skills and knowledge.

The Formal School System

The development of schools has all too frequently been conceived as being exempt from the normal rules of economic decision-making and resource allocation. Talk of people's "rights" and governments' "duties" in this area still cloud many a discussion. Surely people have an equal right to medical care, pure water supplies, decent housing, a pair of shoes, food to eat, some modicum of entertainment and joy in their lives; the list goes on. The requirement to allocate scarce resources between all these as consumption items is not obviated, nor is it facilitated, by introducing "moral imperatives," however real, into the calculus.

As for education as an investment item, the mere existence of the concept of "human capital" does not, as some people appear to think, release one from further analysis and provide a guarantee that education is profitable and "pays for itself." If education is an investment, some embarrassing questions must immediately be asked about the rates of return to the investment. This in turn requires specification of the manpower needs of an economy at a given point in time and a disaggregation of education by content, clientele, etc. There is no reason why the school system should be a sacred cow, immune from pragmatic analysis and evaluation. (I am not, of course, saying that the returns to educational investments generally are low or high. I am simply saying that the returns will vary markedly with the type of education given and how the recipient puts it to use; in short, with the supply and the demand for educated people.)

Primary School

A major controversy has raged for many years about the methods and content of primary schools. To quote the report of an educational commission in Africa: "School methods now being discarded in Europe and America are still too frequently found" (Jones 1922:11). In terms of content there is "almost exclusive emphasis on training directed to literacy and clerical pursuits. The curricula of the schools reflect very little interest in preparing the youth for the great economic and social needs of the country. The pupils are not educated to assist in the agricultural and industrial development of the country" (Jones 1922: 45). The report was written in 1922. It was a major indictment of the type of education that led to the alienation of the student from his rural environment. The same problem has been recognized by virtually every commission since then, and myriad schemes have proliferated to try to do something about it. The results have, on the whole, not been encouraging.

Rural Education without Rural Development. The first problem has been with the clientele for the schooling. If the aim of parents and children in seeking an education is to prepare for the non-farm jobs that formerly offered such handsome rewards to those who completed a traditional academic curriculum, their response to a "rural curriculum" can be predicted. Atrractive, productive jobs in the rural sector are not created merely by training people for them.

Schooling, by its very nature, expands the horizon and quickens the desire for a better life among those who undergo it, but it does not of itself alter the economy of the country nor does it make agricultural policy. Schools can fire youngsters with ideas and ideals, but those youngsters' deductions and aspirations are derived not only from the classroom but also from the marketplace. If the land is dominated by the traditionalists, if agriculture is stagnant and unrewarding, if there is no evident prospect of a better living on the land, any young man who has got the message of education can be expected to leave in search of better opportunities in the cities. In the absence of the institutions and inputs that can make agriculture productive and profitable, the answer is not going to come through mere school reform, even if it is successful. Having attempted to give a student something of an education, one can hardly blame him for being enough of an economic man to forego the prospect of hard work and grinding poverty for something that seems a little better. To call the education anti-rural is hardly to put the blame where it belongs.

School Farm. Further reasons for the failure of agricultural instruction in the rural school are not hard to find. The school farm or garden is frequently anything but exemplary and is milked as a source of funds rather than developed as a model. The necessary time, interest, or specialized skills simply do not exist among the staff. Too often the farm work is imposed on the students as a punishment, or else their labor is simply exploited. Their over-all impression is one of drudgery and their incremental knowledge is near zero.

Teachers. A virtually chronic problem has been the lack of teachers. The task of training them has seldom been undertaken, and where it has, the trainees have commonly been siphoned off into other jobs. Most primary school teachers themselves have little beyond a primary education. Those who have completed a good training program in agriculture as well, find themselves at a premium.

Success in any agricultural endeavor requires being in one place long enough to become fully familiar with local conditions and exigencies; it also requires sustained and continuous care and management. The constant staff shifts and reposting that often go on are a further guarantee of failure.

The motivating, upgrading, and general in-employment training of teachers is, of course, a constant challenge to the educational system. No progress is likely in any field without it. A subject area falling outside the traditional confines is likely to suffer more particularly in this regard.

Curriculum, Books, and Exams. A further problem with the subject-matter of agriculture is that its place in the curriculum is often far from clear. The content and the progression of course material is often not thought out and lacks textbook support. Above all, the examinations are commonly related exclusively to the traditional subject areas. In these circumstances, the rational student, who is hoping against hope to get into a secondary school and generally use his examination results as a means of gaining occupational and social mobility, is hardly motivated to show any interest in applied or developmental subjects.

The Age Gap. Clearly, if one wants to increase the productivity of the farming sector by the injection of new skills, new knowledge, and new attitudes, the people to reach are the farmers or those about to become farmers. Perhaps the least efficient approach is through the preteenage children of the primary school. It will be many years before these children grow up and take major responsibility on the farm, and it is the exceptional father who will take major innovative advice from his son at this age. It is also the exceptional son who has had the experience to enable him to integrate what he learns in such a way that it becomes practicable and useful. Perhaps one of the first lessons to learn, especially about the more specific forms of occupational training, is that effectiveness can be strongly influenced by proximity in time to the job. Highly specific farmer training is not efficiently given to children, none of whom will be farmers for many years and some of whom will never be farmers.

For many of these reasons and more, efforts at a rural curriculum in primary schools have not been encouraging. But before subscribing to what is rapidly becoming the new orthodoxy that all attempts to introduce agriculture into the primary school curriculum are doomed to failure,[2] let us ask a few more questions.

A Reconsideration. Let us first of all face the fact that primary schooling is the only formal education that the majority of people, and especially the vast majority of farmers, will ever receive. The number of people who go through primary schools is generally in the order of ten or even more times the number who receive any further education.

Secondly, primary schooling is probably the most far-flung and pervasive government service. It reaches in a highly specific way into more homes than any other single arm of the government. Primary school teachers are generally by far the largest single non-farm occupational group in the country, and in the rural areas they may be accorded considerable local status.

Third, farmers' budgetary studies often show that primary school fees are the largest single financial outlay of the year. (Needless to say, given the additional income stream expected as a result of education, these funds represent a highly rational investment. Whether or not these returns are realized *ex poste* is a different matter.) Furthermore, the proportion of the government's budget that goes into this area is sometimes disproportionately large.

Certainly, a massive organization and investment of this sort deserves some careful scrutiny. I have tried to show that the overwhelming majority of students who pass through primary school will eventually be concerned in some capacity with agriculture, and probably 90% of them will receive no further education before going back to the land. A five, six, or seven year course that is exclusively concerned with the academic preparation of students for the secondary school entrance examination and makes no effort to prepare them psychologically or educationally for the roles in which they will find themselves, merely dumps into the rural and urban areas a mass of individuals who have acquired deep-seated aspirations and an educational preparation that have no relevance to the way in which they must make their living.

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[2] C. A. Anderson and M. J. Bowman title a section in a recent unpublished paper: "Agriculture in the Primary School, A Hoary Fallacy."

Speaking to this issue in Tanzania, R. L. Thomas writes:

> The present and the prospective overwhelming availability of this kind of manpower has, and will have, no positive or desirable effect upon agricultural development. It will have in all probability a most adverse effect. The same investment in time and money spent on a more relevant preparation for their world of work would convert these young people into highly valuable assets to an increasingly productive agricultural economy which must be the foundation for total economic development (Thomas 1965:5).

To go back to some of the problems raised earlier, the problem of teachers applies in any subject area. It is difficult to teach geometry to hundreds of thousands of children until you have a trained and motivated group of geometry teachers. Certainly students are not motivated to study a subject that is ignored in the examinations. African children will not be efficient learners of their English literature or their French history unless there is a fully integrated system, complete with books, a phased curriculum, etc., to ensure that they do. In other words, none of the criticisms of agriculture in the schools mentioned earlier, reflect on the subject matter of agriculture *per se*; they do reflect on the fact that the textbooks, teachers, curriculum, and examinations have not been "adapted," even where the policy statements have. Nobody, as Moris points out (Moris 1967), blames chemistry as a subject if a school program in it is not going well, yet this is exactly what tends to happen when, for lack of organization, planning, and follow-through, the results of teaching agriculturally-related subjects are poor.

Agriculture provides an ideal core around which to integrate the many subjects taught at school. This does not mean that the subject matter is presented with any less rigor; it does mean that the example material, the application, and the idiom are related to the environment that has meaning for the student and will stand him in good stead when he is through.

I am not suggesting that the fundamental skills of reading, writing and arithmetic be downgraded or ignored--rather the opposite;

these skills are learned faster and are retained longer if they are presented in a familiar context.[3] I am saying that the requirements of good education are that the child should be taught a greater understanding of his own surroundings. Biology is not less rigorous for being "production biology" and dealing with the plants, livestock, pests, and soil of the local environment. I am saying that the entire curriculum and method can and must produce people who are prepared for further education if they can get it, but are also prepared to leave the school system as more productive human beings than they would have been if they had never been to school. Otherwise the notion of education as an investment is a fraud.

The question of the age gap is still a valid one and has led at least one country (Tanzania) to raise the primary school entry age. The reasons given are that the child is able to learn more efficiently when he is a little older, and that the gap between the time he finishes school and the time he is ready to take up employment is reduced (Nyerere [1967?]).[4] The only real answer to the problem of the time and age gap is to limit the highly specific training in techniques, etc., to practicing farmers or those who very soon will be. A number of post-primary or young adult training schemes are an attempt to meet the problem halfway. I shall refer later to training schemes specifically for farmers, which only admit practicing farmers.

In general, one might say that the role of the school system is education and that the role of the non-school system is training, but this gets us no further in deciding what should be taught in which institution. The difficulties in running a successful commercial farm on an institutional basis--managed by people whose prime function is teaching, and worked by those whose function is learning--would seem to suggest that major farming operations should not be undertaken by the primary school. Unless the headmaster (or someone on the staff) is both a first rate teacher and a first rate farmer, a situation that generally accounts for the occasional spectacular successes that dot the literature (Moris 1967:13), school farms have too often been prime examples of how not to do it. Whatever agriculture is undertaken should probably be for experimental or demonstration purposes, or else as a profitable or competitive enterprise for the students themselves.

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[3] See Wharton's footnote, p. 209, in which he gives examples of unrelated and related "word problems" in arithmetic.

[4] This change in the Tanzania schools is part of a far-reaching effort to integrate the school into the rural community. Starting with the budgetary constraint that "we cannot solve the problem of primary school leavers by increasing the number of secondary school places," (p. 11). President Nyerere outlines a policy of changing the entire method, content, and ethic of the school system. The plan is to turn it, from being little more than a selection and preparation process for academia, into a major developmental stimulus for his predominantly rural country. It is certainly an effort that bears watching.

The most compelling case against including agriculturally-related subject matter in the primary curriculum holds when only a small percentage of the students will have anything to do with agriculture. As primary schooling expands in the countries we are here discussing, the exact opposite will be the case. For those who do leave the rural areas following their primary schooling, their familiarity with the economic and material world will be considerably enhanced by their background in agriculture; they will have some concept of the application of science and technology to the productive process; they will be familiar with economic decision-making and the combining of interacting resources for production. Above all they will know something of the developmental requirements of the rural areas. They will not be the typical escapees, ignorant of and divorced from, the environment from which they come and in which the vast majority of their compatriots live.

In making these comments I do not mean to obscure the fact that the educational system is a huge and lethargic network of institutions and not the malleable, uniform system that policy-makers like to assume. Policy statements alone do not bring about change. Perhaps the first step is the training of an adequate cadre of agricultural science teachers; the next may be a careful scrutiny of curriculum, textbooks, and examinations.

If the content of the system merely alienates the child from his environment; if the methodology stultifies him and encourages trite, pat, memorized answers at the expense of creative investigation and analysis; it may well be that the product of the school is less productive and innovative than the man who never had any formal schooling.[5] The rational approach to such an investment would be to close it down and put the savings elsewhere. But even if it could be shown that the returns to an educational investment were minimal or negative, the closing down of entire schools is generally not politically feasible. However, a radical rethinking of the investment in the light of existing further training opportunities for the students, and of their prospective occupational roles, is one of the more urgent tasks faced by policy-makers.

Primary schooling remains an inefficient method of reaching the farmer with the knowledge, skills, and information that he needs. It can, however, be an inexpensive and effective method of transforming the attitudes and ways of thinking of the entire rising generation, and as such, can yield significant returns.

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[5] Harbison writes that "rural primary education, as presently organized" may well be a "negative force in building Nigeria's rural economy" (Harbison 1967:17).

Secondary and Higher Education

I shall not attempt to define the roles of secondary and higher education in the economy as a whole, except to generalize that they should not be too far removed from the effective demand of the employment system for more educated manpower. In terms of the agricultural sector, we must face the fact that traditional and stagnant agriculture does not generate its own demand for such manpower. It uses few non-farm inputs, it is virtually self-contained in terms of both factors of production and technology. There is no point in training agriculturalists, research, extension, or education workers, or the personnel for the myriad peri-agricultural institutions that characterize a productive, innovative agricultural sector if those institutions do not exist.

The most fundamental task of rural development is the creation of a network of productive services and institutions whose task it is to develop, produce, and supply to the farmer a range of new factors, including knowledge, which can be combined by him in such a way as quite drastically to increase his production. These services and institutions require a considerable quantity and quality of trained manpower. Harbison states:

> It is probably easier to develop talent to organize a large industrial enterprise than it is to select, train, and motivate leadership for rural development projects. In most modernizing societies, it is becoming clear that the really perplexing problems of organization and human resource development lie in the traditional and intermediate rather than in the modern sectors of the economy (Harbison 1967b:15).

Public investment in the creation of these services and institutions and the education and training of the personnel to man them is the essence of development policy in a predominantly agrarian economy. Heady traces the background of such public activities in the United States and finds that they have been a major stimulus to development and, by transforming agriculture, they have, wittingly or not, yielded enormous returns to the economy as a whole. He regards these services as major developmental tools which should be understood and treated as such:

> Research and education are not purely stochastic phenomena, with chance occurrence relative to their initiation and outcome. They need not serve as exogenous variables, with their direction predetermined by conventions of the past

> or as by-products of a previous organizational structure. They can be geared to the present and prospective economic or developmental status of a nation (Heady 1964:393). [In the U.S.] development of agriculture has not been left in the free market. Society has invested heavily, and reaped high returns from its direct intervention in promoting progress in the industry (p. 386).

Elementary economic theory suggests that in allocating resources between a number of possible educational investments, the social rate of return to marginal expenditure should be equal in all branches of education. The position of this paper is that the marginal return to more of the traditional type of primary schooling has been driven extremely low in most countries, and the same thing often applies to a great deal of the secondary and university education. In the meantime there was substantial, and occasionally enormous, returns available to educative services that increase the productivity of practicing farmers in the rural areas when these are a part of a comprehensive program to extend a range of new factors to them. It is the task of the secondary and university systems to provide the manpower for such a program.

The Teaching of Science. In view of the irrelevance and the unsuitability of much of the classical subject material in the secondary schools, there has been a considerable effort in the last few years to encourage the teaching of science. Despite the doubling of the instructional costs, scientific subjects are expected to have far more developmental impact and be more related to the process of innovation and technological change.

In a careful analysis of the pure science subjects as they are currently taught, Jon Moris comes to the conclusion that this hoped-for "developmental impact" is minimal: "existing science training has very little transfer benefit to other subjects, to daily life, and to the nation at large." He goes in some detail into the isolation of science teaching, in both the classroom and the laboratory, from anything that the student might experience outside of the classroom. The aim and the end of science is largely taken to be the expansion of the individual discipline, and for the individual, a possible career as a pure scientist.

There are, or at least should be, very few "pure science" careers in low income countries, pure scientific knowledge is in abundant supply relative to their needs and is virtually free. Locally applied science, however, is chronically scarce, and there are a multiplicity of careers that require men to be broadly trained in scientific areas and able to use the findings and methods of the various disciplines in tackling practical problems. The orientation of instructors in the sciences toward academia becomes a self-perpetuating process, and the careers of the brightest pupils are strongly influenced by their instructors. The phenomenon of the "brain drain," the departure of scientists for basic science careers in the rich countries while their own countries remain poor (in part for lack of useful, localized applied knowledge), is one of the results.

Moris presents a list of twenty "instrumental applications of science teaching"--benefits that the science subjects might confer on the students, fitting them for the applied developmental roles that they might be expected to play (Moris 1967). Against each one of the items he lists the five subjects: General Science, Physics, Chemistry, Biology and Agricultural Science. He then evaluates each subject for its contribution to the item as good, fair, poor, or nil. Agricultural Science is strongly favored in the analysis.

In the generalizability of the subject matter, in the relevance of the material, and in the breadth and integration of the terminology of the various scientific and technological disciplines agricultural science provides a superb teaching framework. Further, there is the constant background of the need for financial management, economizing resources, and cost/benefit analysis which is virtually entirely missing in pure science instruction. Above all, a well-conceived course in agricultural science gives students a disciplined introduction to the industry in which a great majority of them will be directly or indirectly involved and provides a head start for those who will go on to further study of the various agricultural disciplines. There is also a great deal in terms of career guidance that such a course could provide. Such guidance can be crucial in motivating and enlisting the personnel for the various peri-agricultural institutions and services that must develop.

I am not here envisioning a special agricultural stream of secondary students. Such a stream too often ends up with the paradox of high opportunity-cost teachers and relatively low-potential students. The vicious circle of low status and poor quality is hard to break in these circumstances. What is called for is an effective agricultural science course within the normal academic stream. As Moris points out, this would create an applied and developmental emphasis in secondary school science; it would introduce the scientific concepts into the real life situations of the students and orient them toward applied careers.

I shall not attempt here to get into an evaluation of the various post-secondary diploma and degree courses that are offered. Many of the principles we have been discussing apply. It is depressing indeed to see the high-priced overproduction of certain categories of "high-level manpower" who might, for all their contribution to the development process, have stayed at home.

There is sometimes as much need for adaptation within the agricultural disciplines at the university level. The amount of material in the scientific fields that can be generalized between countries is not unlimited, and in the social and economic fields one may be talking about a substantially different discipline. The constant interaction of research and instruction is necessary if irrelevant replication of a foreign subject material is not to lead to ivory tower pedantry. Many of the trainees will have a role that involves direct contact with the farmer and if that farmer is tackling the management problems of a holding on the slopes of Kilimanjaro, there is no guarantee that a man who merely "knows the scientific names of beings animalculus" will be of much use to him.[6] A firm background in the biological and technical aspects of agriculture, techniques and habits of research and methods of communicating it to the farmer, a familiarity with the complex decision-making process of the farmer and the broader economic context for that decision-making--these are a few of the most basic requirements of those who would work in and around the agricultural industry.

The task of the post-school system is to man, and to a large extent to create, the range of ancillary agricultural institutions that must surround the farmer, whether they be government, semi-government, cooperative, or private. Among the most crucial of those institutions, and perhaps the most demanding in terms of manpower, are those that carry educative services of various sorts into the rural areas. A cadre of teachers, extension workers, and what the French call _animateurs rurale_ must be produced and they must combine a knowledge of the science and the economics of agriculture with an ability to animate rural people.

The balance of the various skill levels and professions in agriculture, as in any other industry, is essential if gross inefficiencies and wastages are to be avoided. Harbison finds that manpower plans have almost universally ignored the agricultural sector. Comment is unnecessary.

Non-Formal Education

We have now arrived, by a somewhat devious route, at what I take to be the principal subject matter of this conference, the extra-school or non-formal branches of the educational system. I shall make no attempt to anticipate the findings of the workshop or to cover the field. A few introductory comments, however, may be useful.

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[6] In some East African countries efforts to counteract a tendency toward aloof elitism among university students have led to instituting rural development work for these students during university vacations. Ethiopia apparently goes so far as withholding the degree until at least a year of such work has been completed. The scheme has apparently met with considerable success (Fordham 1967).

As I have already indicated, it is here that the returns to educational investments tend to be high, or, to put it another way, it is here that one tends to find relative underinvestment. The formal school system, by definition, reaches only students, and they, by definition are not now involved in productive activity. Furthermore, a large percentage of the education they receive, while it may develop their potential in some way, has absolutely no bearing on their occupational roles and may even teach them habits of academic rigidity and subservience that are distinctly counterproductive.

Adult Education and Literacy. I shall not dwell on traditional "adult education," whose function is to repeat, often in watered-down form, the academic subjects of the schools for those who happened to miss the chance to go to school. Literacy programs, for instance, with their high dropout rate and low retention rate, offer very few benefits. If literacy skills have become a real bottleneck (i.e., there is useful material to read and people who want to read it, and are also prepared to expend the considerable energy necessary to become proficient), there may be substantial economic returns, but this is seldom the case until rural modernization is well underway. In any event, the use of public funds is hard to justify on these types of programs. If the individual pays a fee, the chances are that he will be more strongly motivated to complete the course and put it to use.

Village Polytechnics. The problem of the school leaver has assumed major dimensions in the rural areas in a number of countries. They have had precious little in school that would prepare them for any sort of productive employment that is open to them. Everything has oriented them toward further academic education, and a large percentage of them start correspondence courses (which relatively few complete) or attend pitiful makeshift private schools unrecognized by departments of education, which offer a threadbare copy of secondary schooling.[7] Worse still, many of them make their way to the cities where the vast majority, contrary to popular legend, do not make good.

As part of a concerted effort to turn these youngsters into assets in the rural areas and salvage at least some of the investment made in them by their schooling (quite apart from alleviating the human distress they represent) Kenya is instituting what are now called

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[7] Fordham and Sheffield write: "It is not uncommon to see under-utilized training centres with untrained staff offering irrelevant courses at high fees to a handful of persons who recently took a similar course in another training centre just down the road" (Fordham and Sheffield 1967:11).

"village polytechnics." Each polytechnic has three staff members: a teacher, an artisan instructor, and an agricultural instructor. Between them they would give a two-year, part-time, highly applied course, oriented toward the skills required for making money from a farm or some other rural endeavor (Fordham 1967:12). The growth of both farming and farm-related businesses can receive a major stimulation from this source.

A diploma at the end of one of these courses can provide some sense of achievement, and the general proficiency and brightness displayed can be the basis for distributing farm or business credit and selecting personnel to work in further government, cooperative, or private programs.

It is most important, of course, that programs of this sort remain tied in to the local communities. Participation in various local self-help projects, competitions, athletics, and farmers field days can be most important in this regard. Part-time visiting lecturers from the government departments such as agriculture, health, cooperative, etc., could also play a significant part.

The Extension Service. There has been so much written about the makeup and the function of the extension service that I shall not presume either to cover it or add to it here. There is little doubt that the rate of development of agriculture can be drastically affected by the rate at which new knowledge and information is incorporated into the farms, and that means the farmers. If a major economic potential exists in the agricultural sector, the returns to well-conceived extension activity can be very large indeed, quite out of proportion with the investment. By economic potential I mean that the knowledge, the production factors, and the markets are available. By extension activity, I mean bringing this knowledge into the world of the farmer in such a way that he exploits the potential. In most low income countries at the present time my guess is that a fairly substantial potential exists.

Research. A corollary of the above statement is that if no potential exists (a case approximated by Schultz's self-contained traditional agriculture) the returns to extension activity are zero. Happy bands of extension workers getting to know farmers, spreading a sense of community and all that, but lacking the knowledge that could quite drastically increase the profits of the individual farmer may be doing more harm than good, immunizing the farmer against the time that such knowledge may be forthcoming. An extension service will be, in Schultz's words, an "empty institutional gesture" if there is not constant interaction with research.

By the same token, research will be a useless academic exercise unless there are meaningful links with the production system, the farmers. Many is the country where research and "demonstration" farms are magnificent examples of what man can do but, for all their contribution to the local production system, they might as well be on the moon.

In general, once new and useful knowledge becomes available, the demand for trained manpower increases enormously; entire institutions and organizations must frequently be built from scratch or be developed. To quote the M.I.T. study on Policies for Promoting Agricultural Development:

> Take the example of a new plant variety produced by a research station. If capacity for seed multiplication does not exist, then plant breeders and other agricultural scientists will have to be allocated to this task. A great deal of research will be needed on the interaction of the new variety with water, fertilizer, pest-control measures, cultural practices, and other inputs. When the seed is available in volume, an organization will be needed to distribute it to points of need, along with other inputs that are complementary. Extension education is then needed to disseminate all the relevant information to cultivators.
>
> It is likely that the demand for skilled personnel will grow much more rapidly than the flow of useful research findings. Failure to foresee these manpower needs will frustrate for a time the contribution that the new knowledge could make to agricultural productivity (Hapgood and Millikan 1965).

Perhaps the over-all task of the extension worker is to spot the bottlenecks in the farmer's productive process. If our earlier image of the farmer as a manager and a decision maker is the right one, and if his decision-making environment is becoming infinitely more complex as new factors and new interactions are introduced, the extension worker must provide the knowledge and information necessary for rational and profitable decisions. He must also help the farmer develop his decision-making skill.

Wharton discusses three major kinds of "developmental knowledge": knowledge about new inputs, knowledge about new techniques of production, and knowledge about how to economize in production and marketing (Wharton 1965:213). The first two are technical requirements before we are at first base. The third, the economic requirement, is the essence of the difference between success and failure in the use of the other two. Mere know-how means that one is able to produce, but it does not mean that one is able to produce profitably. Research and extension that ignores the farmers' economizing environment and his economizing ability will, in due course, be ignored by the farmers.

Other crucial issues in any discussion of extension activity must include its internal organization and relation to other services, its methods and techniques, including the use of the mass media; the motivation, retraining, and upgrading of its personnel; the prime clientele for its efforts, etc. In all these areas, first principles suggest one line of thought and experience frequently suggests another. My hope is that we can unravel some of these issues and arrive at more viable principles and more effective ways of operating.

Farmer Training Centers. Frequently the incremental methods of extension are simply inadequate for the great leap in skills and knowledge that the farmer must take. A visit from an extension worker once every few weeks, or few months or more, will not get across to him the complete set of new concepts and techniques that he must absorb if he is to succeed. Mellor points out that the complementarity of inputs is a particularly difficult concept to grasp, and "failure to provide any of a range of complements may easily lower marginal productivity of a new input well below marginal cost" (Mellor 1962).

A further problem is the psychological one, when are changes going to be made in secure old habits and methods, and indeed, ways of life? It is all too easy for a decision to be put off, and the years go by.

An institution that is proving itself to be most effective in East Africa and which appears to merit far wider attention is the so-called Farmer Training Centre (FTC). The Centres combine the benefits of reaching the practicing farmer who can immediately apply what he learns to his own production system, with the requirement that the period of learning is long enough so the teaching is effective. Moris calls them "the best compromise between the needs of intensive and mass education." They also have a versatility that is rapidly making them the nexus of the efforts to upgrade the farming in their areas.

The institutions themselves are small and unpretentious structures with facilities to house up to 100 or so farmers for ten day or two week courses. The farms on which they are located are generally about 20 acres and are run as research, demonstration, and teaching units, using the same factors available to every farmer in the area, and producing the various crop and livestock products that offer the best returns locally. The entire orientation is toward profitable commercial farming. The staff generally consists of one professional agriculturalist and up to six trained assistants of various grades. There is often a woman instructing in the various homecrafts. The trainees pay a small fee to cover the costs of food and fuel.

The courses are intensive and highly practical, and they are geared to the needs and the level of sophistication of whichever group is being trained. They are closely tied in with the extension efforts in an area and ideally the local extension agent comes in with the farmers from his locality. The selection of trainees for the course and the follow-up after it are in large measure the responsibility of this agent. The rate of adoption of prescribed techniques has been nothing short of spectacular (Moris 1967:F). The demand for a place in a course has increased rapidly. The farmers' respect for the FTC staff is enhanced by the field evidence that they are themselves successful farmers.

A second role of the FTC, which might well compete in importance with their primary role of training farmers, is the further training and upgrading of the various peri-agricultural workers in extension, business, teaching, cooperatives, etc., that serve the farmer. Continuous, periodic training throughout the careers of these people has often been shown to be even more effective than their initial training. It also provides a continuing basis for personnel selection, etc., which is the heart of avoiding the bureaucratic stagnation that can descend upon, and completely immobilize, a government service.

While the FTC can be the hub of the range of educative services in an area and should be linked geographically and institutionally to whatever research and other agricultural services exist, they present many requirements of their own. FTC personnel training and constant upgrading is essential. A national organization of some sort (Staley's O.T.O.) is required to initiate and administrate them and coordinate their activities with the others that extend knowledge and information to the farmer.

I shall not attempt to summarize this paper; it has merely touched on a number of areas that need examination. It is, however, clear that the development of the agricultural sector is basic to any economic progress in predominately agricultural countries. It is also clear that the development of this sector is dependent on the knowledge, motivation, and skills of the farmers and of those who man the institutions that must develop around them.

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V. FRONTIERS FOR ACTION IN OCCUPATIONAL EDUCATION AND TRAINING

A. Report of Workshop Discussion

Where Research is needed

- Research in Nigeria
- Research in Latin America
- Research in the United Kingdom
- Research in the United States
- Storage and Retrieval of Information

Implementation of Better Occupational Education and Training Programs

- Implementation in Nigeria
- Implementation in the United States

Concluding Remarks

B. Related Workshop Papers

Frame of Reference of the Comparative Education Study and Adaptation Center (CESAC).

V. FRONTIERS FOR ACTION IN OCCUPATIONAL EDUCATION AND TRAINING

A. Report of Workshop Discussion

Where Research is Needed

Dr. Staley opened the final session of the Workshop with a description of four types of research jobs that need to be done in the field of occupational education and training: research to guide operations, research to improve methods, research to expand knowledge, and research on techniques of research. He felt that probably research in the field of education and training should take a broad systems approach and ask how all factors such as education and training opportunities, employment opportunities, relative wage levels, and legal constraints fit together in an incentive system to make a person want this education and training.

At SIDEC work is proceeding on a number of case studies in cooperation with several institutions around the world. It will include a comparative analysis of what seems to work rather widely and what does not work and why. SIDEC is also embarking on several cost-effectiveness studies to be done in different countries under different conditions to give a better basis for policy-making. Dr. Staley also suggested that much might be learned by studying the experience of large international companies such as IBM and Standard Oil in training persons around the world.

Dr. Rao presented for the consideration of the Workshop several areas in need of study and research. A study is needed of the structure of incentives necessary to encourage industries to put more money into training programs. Several Latin American countries would be ideal for this, including Argentina where the large automobile companies have set up their own "vestibule" schools. A study of existing laws may lead to a revision of the taxation formula and reveal new methods of providing incentives to industries to set up more imaginative "in house" training programs.

Another area that needs investigation is the variety of legal constraints to expansion of training activities in both public and private sectors. Such a study would focus on the costs of programs in relation to social security and other fringe benefits that are part of the already heavy tax burden on industrial payrolls in Latin America. Often, industry is required to indefinitely hold open the job of a man taken for military service, meanwhile continuing all social security payments.

In the area of transfer of sophisticated technology to the developing countries, many unusual training problems arise:

- the projection of intricate tool and die designs via the satellite and the computer;
- extending manufacturing know-how to small industries in developing countries as well as to large companies;
- extending know-how to persons widely dispersed geographically, as in Alaska, the Indonesian archipelago, or the Caribbean Island chain.

While mobile land vehicles, fitted out with complete mechanical shops are already being used to reach dispersed populations, proposals for using ships as mobile training facilities with residential amenities to serve populations separated by water are now being examined.

Finally, a study needs to be made of the problems inherent in the "brain drain" and the possibilities of a common market for skilled manpower. Especially where a common language facilitates the flow of workers across borders, what can be done about the situation where workers trained in, say, Chile are lost across the border into Argentina where wages are higher?

Mr. Levine stressed the importance of more work in what might be called the "feed-in" and "feed-out" of the training process. "Feed-in" would cover techniques for identifying the kinds and quantities of occupations in existence in a country in as much detail as a three or five digit code, as well as the substantive content (the common and differentiated technical information required) within these groupings. This would make available to training organizations [occupational training organizations (OTO's) or formal educational institutions] the information they need for more intelligent decisions about the kinds, quantity, and content of courses to be offered. Such decisions are now made largely without this important information, leading to great waste and inefficiency in training programs. "Feed-out" would be follow-up information on the graduates of programs run by OTO's and by vocational schools, which would provide evidence for gauging the relevance of the output of these training organizations to actual needs.

Dr. Rao pointed out that most of the studies and research being carried out in the newly developing areas are being done by outsiders. Training local persons to do this work becomes a question of major importance and difficulty, because these countries do not generally recognize the importance of research and lack the administrative or financial mechanisms to support it.

Both Mr. Ennaceur and Mr. Zaidi felt that the amount of fundamental research a newly developing country can, or should, do is very limited. The emphasis should be on adapting the results of research done elsewhere by more affluent areas to the conditions of that particular country. Evaluation and follow-up are very important parts of this research.

Research in Nigeria

Dr. Skapski spoke of the new Center for Comparative Education Study and Adaptation (CESAC) at the University of Lagos in Nigeria, described in some detail in a paper at the end of this section. One of the important tasks of this organization is to gather information around the world about techniques leading to a shortening of the time required for the technical part of occupational training and to adapt them for use in Nigeria. Released time would then be used for more basic education. Special arrangements are to be made to test promising techniques in appropriate schools or institutions in Nigeria, to get feedback about further possible improvements.

Research in Latin America

Mr. del Campo explained that CINTERFOR functions as a center for information, research, and documentation for the various Latin American OTO's. Workshops are set up on agreed subjects of interest, and the results of studies contracted out to universities or private persons become available to all. Some recent studies are on methods for planning and financing occupational training in Latin America and for finding ways to get enterprises interested in training programs. Several workshops have been organized on programmed instruction, on-the-job training analysis, and training of supervisors for vocational training.

Mr. Levine noted that a recent attempt by SENAI in Brazil to examine how well, or badly, accelerated training programs sponsored jointly by SENAI and the Ministry of Education were working revealed, among other things, that better techniques are needed for evaluating the output of training courses--a "feed-out" problem.

Research in the United Kingdom

Lady Williams spoke of the research being promoted by the U.K.'s Central Training Council through its Research Grants Committee, of which she is Chairman. It is endeavoring to extend the really very small areas of knowledge in the field of occupational education and training. This Committee gives grants for research of a practical nature which can have an application in the near future. It will accept applications not only from universities and research institutions, but from qualified private individuals, as well as from industrial training boards. These must be for projects which are of demonstrable value to other industries and will be made available to them. Applications will also be accepted from private firms on the condition that all the results will come into the public domain.

At present a project has been set up at Sheffield University to search out methods and techniques for validating programmed instruction, which is becoming very popular in the field of technical education. A register of programmed instruction is maintained by BACIE, the British Association for Commercial and Industrial Education.

Lady Williams stated that the term "research" is used generally in its very high-powered sense, involving batteries of interviewers, codifiers, and eminent social scientists. Actually, it must also include a much lower level of activity which is of great importance. Indeed, what often stops the high-powered activity is the inability of firms to answer from their existing records sometimes even the simplest of questions. Thus, it becomes very important to design business records so as to make the existing mass of raw information usable in research.

In view of this, the Research Grants Committee is financing two projects in this area. One involved the development of an adequate system of records which can be recommended to firms and will enable the records themselves to reveal the progress of a specific course of training they may be undertaking, without necessitating an outside researcher to come in and ask questions. The other closely related project is the organization of a short training course to teach people in the firm to use their records and to elicit from them material to assess their success in the training field.

Research in the United States

Dr. Sidney High spoke at some length of the program for research, development, and training in the field of vocational and technical education authorized in 1963 by the U.S. Congress and administered by the U.S. Office of Education in the Department of Health, Education, and Welfare. This program started against the background of a long history of research in general education which had resulted largely in a great number of studies on the shelves of libraries and very little change in the classroom. The new program was planned in such a way that it was possible to begin with basic investigations--for example, in the field of psychomotor learning processes--then, on the basis of hypotheses arising from these studies, to move on to a developmental study of a more effective way of training or meeting a certain need. At this stage, a full-blown pilot project can be operated for several years to evaluate the proposed new methods and determine whether the program embodying these ideas really works to accomplish the end in view. From this stage, under the legislation, it is possible to fashion a short training institute dealing with the successful and proven techniques tested in the pilot study and bring together two or more people from each state for a summer study of this new method of training. These people then are responsible for introducing these new techniques in their areas of influence within their own states.

Since the program is just three years old and most studies take three to five years to complete after being identified and set up, the full impact at the output end of the program is not yet evident, but the outlook is hopeful.

It must be realized that while about 45 billion dollars is spent annually on the total educational enterprise in the U.S. from kindergarten through the university, only about 4 billion dollars--or a bit under 10%--comes from the federal government. The federal role in education is comparatively small. Therefore, it was decided that federal funds should be used as the creative margin to move out and do special investigations on innovations which the local districts cannot afford because all their money is tied up in operations. In this way, there is the possibility of making some breakthroughs, and the impact of this money should be much greater than its numerical size would indicate.

The funds have been used in two important ways: for program support, and for project support. There are many broad problem areas where fundamental research of an exploratory nature must be done to achieve a breakthrough. Since the end product is unknown, this work cannot be contracted out as a specific project with a designated end product, and so the concept of program support was developed.

Program support has permitted the establishment of fundamental research centers, two of which are now in operation: one at North Carolina State University, and one at Ohio State University. Here persons from several disciplines--psychologists, economists, educators, sociologists--are brought together for open-ended, exploratory research. It is hoped that this will constitute a critical mass which will generate a chain of reactions, or a synergistic effect that will result in a yield greater than the sum of its individual parts. Specific research projects with an identifiable end product which arise from this activity can then be contracted out as separate entities.

In addition to these two national research centers, funds were offered the state governments for fifty "Research Coordinating Units" set up to deal with the specific needs of each state in the field of vocational and technical education. The RCU's were paying for people competent in research design and evaluation to map out research needed, to structure it, and to get it underway. In most cases the projects are carried out with state funds, but in the case of an extensive and expensive study whose findings will be generally applicable to many states, matching federal funds can be made available.

In the field of project support, to date 450 studies have been launched, based on contracts negotiated with various organizations to carry out approved lines of investigation with a specified end product proposed by the party to the contract. Here the problem is to monitor the project to be sure the research is being carried out according to the terms of the contract. When the final results are in, the quality of the study must be evaluated to determine whether it is acceptable. Then, of course, it must be fed into the public domain, since it was paid for by public funds.

An interesting three-dimensional structure was conceptualized by David Bushnell of the U.S. Office of Education. On the one hand, there are the human resources; on the other hand, the employment opportunities; and somewhere inbetween lies the educational mechanism. In the human resource field are found the basic psychological and sociological studies of people who must be dealt with--their characteristics, what motivates them, the social forces operating on them. In the employment field there must be studies of the labor market itself, its specific needs and their changing character. (Many of these studies are jointly funded by the Department of Labor and the Office of Education.) And then there are the studies, which must be based upon both these areas, to design the most effective training processes through which the human resources can be passed to fit them into the employment opportunities. This concept has provided a handy framework for classifying some thousand proposals.

When this flow of proposals was classified, it was found that they were concentrated in certain areas, with gaps where no one had submitted a proposal to cover a particularly knotty problem that needed research. To fill these gaps the device of "request for proposals" was created. This device consists of having the Office of Education itself write the specifications for a needed study and publish it under government procurement regulations, as the specifications for an air strip, for example, might be published. The proposals which then appear in response to this request are analyzed to determine which has the best and tightest design from an organization of known capability, at the lowest cost, and the contract is awarded.

In addition to the many studies of the learning characteristics of youngsters, it appears that much research needs to be done on the basic nature of the older adult learner: his learning style and the patterns of facilitation and interference characteristic of the mature mind. (This problem was discussed briefly in the section on Curriculum.)

One of the knottiest of problems appears to be that of evaluating training techniques. There has been much interest in the cost-benefit studies which have been used in the Defense Department, and the President has ordered that these methods be applied in the Department of Health, Education, and Welfare. However, the people who have brought these techniques of cost-benefit analysis of weapons systems from the Defense Department have learned that they cannot be directly transferred to an analysis of health, education, or welfare systems. Although the broad principles of cost-benefit analysis are very valuable, a new technique must be developed for the educational setting. Studies underway are concerned with developing tools and techniques for accurate evaluation which are essential to good administrative decisions about the expenditure of limited educational resources.

Lady Williams agreed that in Britain, too, the most difficult problem lies in the area of validation. Although it appears quite easy to evaluate the success of a training technique where the task involved is to produce something which has a measurable output, it is quite another thing when it comes to an intangible product such as management or supervision. So far her Research Committee has not been able to approve any research proposal in this field.

Storage and Retrieval of Information

Dr. High spoke of the mechanism the Office of Education has set up for the storage and easy retrieval of the results of the extensive research program it is sponsoring in vocational-technical education and other educational fields. The vocational-technical research program alone has turned out 450 studies in three years. In ten years the number may reach 1,000, and there are additional thousands of studies in the field of general education at the preschool, elementary, secondary, and university level.

The key to this storage and retrieval system is the little booklet entitled, Research in Education, mailed monthly to subscribers by the U.S. Superintendent of Documents in Washington. This booklet carries a 200-word abstract of the findings on each study completed during the month, plus information as to who did the study, how long it took, and where it was done. In the back of the booklet is a list of new studies launched during the month anywhere in the U.S. under this educational research program. Readers interested in examining the study itself may order the complete study in hard copy or on "microfiche"--a small film card about 4" x 6" in size which holds fifty pages of text and costs 25 cents. The microfiche card, of course, requires a microfiche reader; however, it makes possible the housing of thousands of studies in a small box.

Dr. Brunner told of the functioning of the Clearinghouse of the Educational Research Information Center (ERIC) at Columbus, Ohio. This service indexes studies done by all educational institutions, as well as the U.S. government. One can ask of ERIC, for example, what research is being done on training of dental assistants in the U.S. and get a complete answer very rapidly.

Lady Williams mentioned a new information retrieval system in the United Kingdom set up under the Industrial Training Act of 1964. The Training Department of the Ministry of Labor now publishes a Register of Industrial Training Research, a Glossary of Training Terms, and abstracts of the more important results of research projects.

Implementation of Better Occupational Education and Training

The principal problem in the field of occupational training, in Mr. Nikom's opinion, was not so much new techniques and new ideas but rather new methods for implementing and putting into practice the ideas and techniques known and ostensibly accepted but seldom actually put in operation. He pointed out that all of Dr. Staley's books are in the Thai libraries, and for the past six years there has been much discussion and apparent acceptance of ways of relating skills and training to the requirements of industry, but educational practices continue as before. While it was possible to gain acceptance of hybrid corn by the Thai farmer in only three years because he quickly saw that he could double his yeild, what we are concerned with here is a much less tangible item. People do not see its advantages immediately.

Dr. Staley related the story of the agricultural extension worker who approached a farmer with the suggestion that he ought to go to the State Fair to see all the wonderful agricultural exhibits and learn how to be a better farmer. Replied the farmer: "Young man, I ain't farming now half as well as I know how." So a high priority item, is, indeed, what are the processes by which what we already know can be put into action?

Lady Williams pointed out that implementation actually consists of two separate operations. The first is to disseminate the information beyond the researcher and the very small audience of people who read published research papers to the whole community concerned, so that it becomes a part of general knowledge. The second step is to persuade people to do what you are urging them would be the right thing to do for their own good: to change their methods; not merely to come with their bodies to take the training, but really to alter their methods of operation after they've taken the training.

Dr. Rao discussed some of the general principles of implementation and stressed that it must take place not only on a national scale but also on an international scale, because many elements, particularly of industrial education, do not change from country to country. He pointed out that climate building--which he did not wish to call public relations--is an important element, because occupational education has too long been the stepchild of general education. This fact is not unrelated to the paucity of outstanding leadership, which is one of the elements necessary for effective implementation. So the real question is how to enlarge the circle of dedicated and committed leadership, such as was represented at this conference, in order that the very important area of education and human resource development can be attacked and developed to its fullest extent. The other important element in implementation lies in the field of government policy. The various elements of education planning and manpower planning, and the corresponding institutional relationships, must be integrated into an orderly network to avoid the duplication of facilities and programs which too often occurs.

Implementation in Nigeria

Mr. Ozoro spoke of the important principles of implementation arising out of his experience in the Nigerian Comparative Technical Education Seminar Abroad and the subsequent writing of the Seminar's report. In this case climate building was achieved by bringing together the eminent and influential secretaries of ministries of education of the various parts of Nigeria to discuss the project and agree upon its importance. These people in turn selected responsible officials in their ministries to participate in the Seminar--men who were actively involved in vocational and technical education but who were nevertheless made available for a sufficient period of time to see the entire program through to its conclusion.

The first phase of the project was the visit to Sweden, Holland, the U.S., and the U.K., where programs of technical education were observed, discussed with high officials, and evaluated in evening discussions of the group. However, the major part of the project, so far as implementation is concerned, occurred after the group returned home. This required several months of sitting down together, arguing through points which were either accepted or rejected, and--most importantly --all the while consulting with the persons who would be actively involved in implementing the final recommendations. These persons came from schools and from industry, which at first was often resistant to many of the ideas. However, through this process of active consultation industry began to change and agreed to undertake studies to see whether the recommendations could be implemented. As a result, almost all of the recommendations made in the report can be implemented to some extent, or at least tested.

Following the writing of the report came a series of meetings with officials of the various ministries for the purpose of setting up the pilot projects based on the recommendations. Although it was often necessary to utilize experts from abroad to set up the project, care was taken to include indigenous officials--Nigerians--who could take over the project after a time and carry it on.

Thus the three essential elements in implementation are:

(1) creation of the right climate of opinion at the very highest possible governmental level,

(2) active involvement of those persons who must carry out any recommendations arrived at, if they are to be carried out,

(3) inclusion of indigenous officials along with any foreign experts who may be required in the initial stages.

It was generally agreed that often the difference between success and failure of a project hinges on the depth of commitment and dedication on the part of key personnel; but that it is also important to widen as much as possible the circle of people involved, which must of course include employers as well as the persons to be trained. In addition to whatever can be done to build a favorable climate in a certain critical --but restricted--area, there remains the importance of assessing the wider climate in which a project must be implemented so that it can be formulated in such a way as to have a chance to succeed. As Mr. Podesta pointed out, an anthropologist-sociologist with his knowledge of basic tribal characteristics will not attempt to introduce a cooperative scheme of agriculture into a tribe whose basic motivation is toward independent action. He will rather seek out a group whose pattern is based on community action.

Implementation in the United States

Dr. High spoke at some length on ways in which the U.S. Office of Education has approached the problem of implementation: how to get into the classroom the knowledge and methods which the extensive research and development program has turned up. Since the basic control of education in the U.S. is in the hands of local school boards, the problem was to determine exactly where the key decision-making points are located so that it would be possible to use a sniper's rifle, instead of a shotgun blast, to get an effect. A communications study of the American school system revealed that the decision-making point depends upon the nature of the particular innovation being considered. If one is talking about an 8-mm. single-concept film that is three times more effective in teaching physics than the method in use, the critical decision maker may be the business manager in the local school district. He decides whether to put money into 8-mm. projection equipment or to buy some new TV sets. However, if a new mathematics curriculum is being considered, the decision maker is probably the district supervisor of mathematics. On the other hand, if the item in question is a new social studies curriculum, the key element in gaining acceptance may be some organized labor groups, the chamber of commerce, or other groups who are very concerned about the nature of social studies taught the younger generation.

The recipient of all this research--the teacher himself--is of critical importance in any system of implementation, and an attempt has been made to sensitize him to new methodology. A consultant is made available in the state research coordinating units to whom any teacher who has a research idea can turn for help. If an electronics teacher has an idea, for a device which may improve his course, the consultant can help him design a small research project to experiment with perfecting his idea. The cost of this project is small, and the contribution to the over-all store of knowledge may be minimal; but the real gain is one more teacher who is research-minded and will be sympathetic to the larger-scale innovations.

Dr. High also discussed the schematic diagram for implementation of a rather large-scale project as outlined in Morgan and Bushnell's "Designing an Organic Curriculum (see Workshop Papers in Section II). This envisages a parallel movement of research and development along with dissemination of information. On the one hand, the curriculum analysis, research, feedback and correction is proceeding. Concurrently, the idea of the organic curriculum is being introduced to professional groups, university groups, teachers' associations, etc. In the next phase, the program may be tested in only a few districts while information about it is being disseminated through journals and in popular media. Thereafter, the curriculum is to be put into operation in pilot schools while the concepts are being presented to state and regional education associations. Finally--five or ten years hence--when the curriculum has been revised, refined, and is ready to go, presumably you have a favorable climate of opinion developed in the groups which must approve the curriculum for general use.

Concluding Remarks

Toward the end of the final plenary session Dr. Skapski expressed the opinion that the exchange of experiences and viewpoints at this Workshop had been so valuable that an occasion should be provided again in a couple of years to repeat the experience. Dr. Staley raised the possibility of regional meetings, and Mr. del Campo expressed the desire to find a way to bring to Latin America appropriate persons from the U.S., Africa, and the Mid and Far East to share their experiences at some of the CINTERFOR conferences. Dr. Allee felt that some thought could well be given to the reasons why the present Workshop had been such a fruitful experience.

B. Related Workshop Papers

Frame of Reference of the

COMPARATIVE EDUCATION STUDY AND ADAPTATION CENTRE (CESAC)[1]

during its formative years - 1967-1972[2]

The Description of the Centre

The Centre is an educational research body within the College of Education of the University of Lagos, appointed by normal academic procedures for this purpose, one of these members of professorial rank will be responsible for the over-all functions of the Centre and will have the title of the Director of the CESAC. The Ford Foundation Advisor to the Centre will have the standing of a member of the Centre with professorial rank. The Centre will also have at least one senior non-academic member of staff, called Executive Secretary, who will supervise all other non-academic staff of the Centre and will be administratively responsible to the Director of the Centre.

The internal organization of the Centre and the areas of planned activities will be formulated jointly by the members of the Centre, meeting under the chairmanship of the Director. The respective proposals (or their essential changes) will be submitted for comments to the Centre's Advisory Board (see composition) before the final decisions are made by the Centre's staff on the basis of the majority vote. The decisions will then be submitted through the Provost of the College of Education to the University Authorities for approval.

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[1] Set up under the provision of para. 7-2 (a) of the University of Lagos Decree, 1967, with the support of the Ford Foundation.

[2] This document has been prepared by

The Provost of the College of Education, University of Lagos, Chief of Taiwo
The Acting Dean, Faculty of Engineering, University of Lagos, Dr. Oladapo
The Ford Foundation Advisor, Dr. A. Skapski

at the meeting held in Lagos on May 13, 1967.

During the period of organization of the Centre all decisions concerning the Centre will be made by a working committee composed of the Vice-Chancellor (Chairman), the Provost of the College of Education, the Dean of the Faculty of Engineering, the Registrar, the Bursar, and the Ford Foundation Advisor to the Centre.

The Functions of the Centre

The Centre should act as an observation post on the look-out for the best in general and technical education anywhere in the world, in order to keep the country aware of current trends and specific achievements in foreign general and technical education. It will also engage in original research in the field of comparative education.

In this task, the Centre will be assisted by its Secretariat (Clearing House) which will collect information about the new developments abroad, store new curricula and syllabi of foreign educational systems, and make the latter available to the members of the Centre. All academic members will also pool the results of their research abroad by registering them with the Clearing House.

The Centre should, from time to time, arrange well prepared reconnaissance surveys of general and technical education in foreign countries by small groups of experts from Nigeria. These surveys would investigate the recent developments on the spot, looking particularly for such approaches and techniques as would be adaptable to the Nigerian situation.

The Centre should, as a follow-up, arrange conferences of specialists, it may test (with the cooperation of appropriate foreign and/or Nigerian institutions) new approaches and techniques, in especially deserving cases, the Centre may purchase out of its special fund relevant equipment and, under mutual agreement with proper authority, set it up in educational institutions anywhere in Nigeria to test and then demonstrate, under Nigerian conditions, the new techniques. In particular, it is planned to use the Comprehensive High School in Aiyetoro for the cooperation with the Centre in this respect.

The Centre may publish reports about its findings and activities in English and French for distribution particularly to the interested institutions in African countries.

To perform these functions, the Centre will include at least two academic divisions--one concerned with general and one with technical education, and a Clearing House, composed of non-academic personnel.

The Advisory Board

The Advisory Board will be composed of:

The Provost of the College of Education (chairman)
One Representative of the Senate of the University of Lagos
The Director of the Centre (ex officio)
The Ford Foundation Advisor to the Centre (ex officio)
The Dean of the Faculty of Engineering
One Delegate of the University of Ibadan
One Delegate of the University of Nigeria, Nsukka
One Delegate of the University of Ife
One Delegate of the Ahmadu Bello University, Zaria
The Delegate of the National Educational Research Council
Two Delegates of the WAEC
The Delegate of the NECA Training Committee

One Delegate from any other University or Institution in any country which is actively cooperating in the execution of the CESAC program.

All academic members of the Centre will attend the meetings of the Board as observers.

The Advisory Board should be called into session at least once a year, to help the Centre to keep in contact with the Nigerian situation.

The Duties of the Academic Members of the Centre

Each academic member of the Centre will normally be required, besides devoting himself to research relevant to the program of the Centre, to teach one course closely related to his research. This course does not have to be given at the University itself. Quite to the contrary, if the member is actively engaged in, say, improvement of Craftsmen Education, his course must be given at a craftsmen training institution. The aim is to assure close contact of his research with reality. If an experimental project is set up by the Centre within the member's area of interest, it will be his duty to supervise it.

It will also be the duty of the Centre to hold seminars and lectures on comparative education as a service to the College of Education, within a restricted maximum agreed upon by the Executive Committee.

The Executive Committee

The Executive Committee of the Centre will be composed of:

The Provost of the College of Education
The Director of the Centre
The Ford Foundation Advisor to the Centre
The Executive Secretary of the Centre (non-voting)

The Executive Committee will see to it that the policies of the Centre are properly carried out. It will also supervise the expenditure of the funds withheld by the Ford Foundation and administered by the Ford Foundation Advisor on behalf of the Foundation. The official designation of such funds is "withheld for a Foundation-Administered Project." Those funds are disbursed by the New York Ford Foundation Office, according to established Foundation procedures.

The International Evaluation Panel

At least once every two years a panel of internationally renowned educators, scientists, and technologists should be invited to Nigeria for a session in order to evaluate and criticize the past activities of the Centre and to advise on the planned program of the Centre. It is hoped that the Ford Foundation will provide special funds for this purpose.

REFERENCE LIST

Below are listed items referred to in the Workshop discussions, or circulated in advance to participants, or supplied by participants to each other during the Workshop--except for papers reproduced in this volume, which are listed in the Table of Contents.

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